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Labio-glossopharyngeal Paralysis (? Botulism).*

An Account of Six Fatal Cases in Horses.

By T. Eaton Jones, A. W. Noel Pillers, and H. T. Matthews, Veterinary Department, City of Liverpool.

The following is an account of an enzootic condition which occurred in one stable between June 22nd and September 5th, 1927. The reasons we have chosen the above title will become evident when the nature of the disease is discussed. It is somewhat similar in its symptomatology to "grass disease" and bears a very close resemblance to several clinical conditions, apparently similar, but with different names, *viz.*, forage poisoning, toxic bulbar paralysis, bulbar paralysis, botulism, parabotulism, lamsiekte, and a number of affections loosely associated with the word "staggers." Each case is here described as it appeared to us at the time, and then follow certain observations as they then presented themselves. In view of the later conclusions, it is needless to say that quite a different aspect was placed on the earlier cases. We think, however, that the best interests of the practitioner will be served if the reader is taken over the ground as we traversed it. We have been as brief as possible and have not burdened the account with obvious detail in symptomatology, treatment and management. Perhaps we have missed certain points which others would have recorded.

Throughout the account R. = number of respirations per minute, P. = the pulse rate per minute, and T. = the temperature in degrees Fahrenheit.

The standard diet was Canadian hay, Chilian oats, English beans and brewer's dried grains. From June 11th a small amount of grass was given—chopped.

There were approximately seventy-seven horses at the yard in question.

Case 1.—Bay, shire gelding, "York," seven years old, purchased January 3rd, 1925. Had not been out of town since entering it, and although in good working condition, had never carried much fat. Early in 1925 he had an attack of pneumonia and was stated to be a little timid when the head was handled. About a fortnight prior to developing symptoms, he had a temperature of 102° for two days.

June 22nd.—Did not clear up his food. R., 18; P., 58; T., 101. Slight swelling of the submaxillary salivary glands, with a little muco-purulent discharge from the nostrils. Treated for sore throat.

June 28th.—It now became evident that he was losing flesh somewhat rapidly and was not taking enough liquid and solid food to keep him going. Water was taken eagerly but most of it returned by way of the nose. He was much weaker, but had been resting properly. The off fore limb was noticed to be rested and the muscles directly behind the shoulders trembled a great deal. R., 20; P., 68; T., 102. The belly was "tucked up."

June 30th.—R., P. and T. as on June 28th. Both upper eyelids were swollen; there were abrasions on each temporal region. He tried to eat and drink but could not swallow. In addition to the above signs, he appeared unsteady on his legs and the teeth were used in prehension. It now seemed evident that the bulb of the brain was involved.

July 1st.—There was marked salivation. He spent most of the time lying down. A bucket of water was given by means of the stomach tube and some gruel was prepared, but he lay down and remained so until he died quietly at 10 a.m.

Length of illness about nine days.

Post-mortem Examination, conducted two hours after death. There was an accumulation of food along the upper molars, and odd tooth scars occurred on the tongue nearly opposite the fourth molar. There was a small amount of chop in the anterior portion of the pharynx. The posterior portion was of a deep red colour, and the follicles were prominent. The epiglottis, entrance to the larynx and the tracheal mucous membrane were of the same colour. The œsophagus was thickened in the inferior third, there was moderate gastritis with slight ulceration. Near the ileo-cæcal valve the ileum was three times the normal thickness for about two feet. The cæcal wall appeared thicker than normal and its mucous membrane was reddened. The double colon was mostly inflamed, but the state of its contents seemed normal. The left lung contained a fibrosed area just behind the heart, apparently the result of the illness in 1925. An excess of cerebrospinal fluid escaped when the head was severed from the cervical vertebræ, but the brain was macroscopically normal.

* * *

The brain and pharynx were handed to Professor Gaiger, but the examination of them did not reveal any features of value in diagnosis. The *post-mortem* appeared to justify the view that death was due to paralysis of the pharynx, caused by something which had also irritated the alimentary canal.

It will be seen that on June 30th we came to the conclusion that the bulb of the brain, of this, the first case, was involved, but with the definite history of being "a bit funny" about the head, we did not pursue the matter further than handing the brain and pharynx to Professor Gaiger.

As the commonest cause of paralysis of the pharynx appears to be "damaged fodder" a very careful enquiry was made into the nature and character of the food and bedding. No abnormalities were, however, detected.

Case 2.—Black shire gelding, "Zulu," six years old, purchased April 30th, 1926. He had not been out of town since joining the stud and there was no previous history of "colic."

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July 4th.—He went to work as usual, having eaten up his morning meal. At noon the carter brought him into the stable with a moderately severe attack of "colic." He was given a ball containing chiefly carbonate of ammonia and was seen at 2-30 p.m. R. very accelerated, P., 78; T., 102. The visible mucous membranes were greatly injected, there was marked general tympany and the sweat was running down both fore and hind legs. Rectal examination revealed the presence of a few very hard fæcal pellets, covered with a film of mucus. It was impossible to ascertain the exact state of the abdominal viscera on account of the distension. A provisional diagnosis of impaction of the colon with great tympany was made. An attempt to pass the stomach tube caused retching. Enemata were retained if given in small quantities. Arecoline hydrobromide, gr. 1, and strychnine hydrochloride, gr. 1, were given subcutaneously. After a while the patient lay down carefully. There was marked salivation (due to the arecoline) with eructations of gas and signs of vomiting. There was no passage of fæces and only a little flatus. At 6-30 p.m. the condition was much the same, when a dose of turpentine in linseed oil was given. The animal remained in pain and died somewhat suddenly at 8 p.m. Length of illness about nine hours.

Post-mortem Examination, conducted at 10 a.m., July 5th. Immediately on opening the abdomen, most of the double colon and portions of the small bowel came through the incision. The posterior portion of the pharynx was of a deep red colour, as were also the epiglottis, entrance to the larynx and the trachea. The bronchi contained some blood-stained froth.

There was no smell of turpentine. The second and third portions of the double colon were congested throughout; the contents of the fourth portion were dry and covered with a film of mucus. An odd fæcal lump or two, in the floating colon were in a similar condition. It was thought that the animal had died of a partial twist of the double colon, which was lost to view as the organs left the abdominal cavity. Owing, however, to the condition of the throat, it was felt that the case bore some resemblance to Case 1.

* * *

We were not satisfied that we knew the whole story with regard to this case. The *post-mortem* was unsatisfactory and disappointing, inasmuch as we thought there had been a twist, but we could not prove or disprove this point. On the other hand, with symptoms of "colic" during life, it presented a somewhat similar *post-mortem* picture to the last case, the symptoms of which were those of paralysis of the pharynx. These points are, as it will be seen later, of easy explanation and of the greatest possible value in diagnosis.

Case 3.—Bay shire gelding, "Winkfield's Pride," eight years old. Purchased August 21st, 1923. He had not been out of town since entering it and was in very good condition.

July 8th.—R., 18; P., 60; T., 101. He does not appear to be eating properly, but is eager. Several masses of chewed grass were noticed in the manger. A small amount of grass-stained discharge came from the off nostril. Nothing abnormal could be detected in the mouth. Sore throat was suspected and electuary was given with friction to the external parts.

July 11th.—The condition was much the same. T., 102. The mouth was re-examined with gag and torch and the teeth were rasped. The impression now gained was that the pharynx was abnormally large. The swallowing of solids and liquids was defective. An examination per rectum revealed a few hard lumps of fæces and caused attempts at straining. This examination was carried out because there were no fæces to be seen amongst the bedding. Very little urine passed but the penis was often protruded.

July 12th.—R., 25; P., 80; T., 102. The act of swallowing appeared to be more defective but he drank a little liquid. The muscles behind and just above the elbow, and those of the loins, trembled considerably. He appeared stiff when getting up and down, and bruised his off eye and shoulder during the evening when getting up.

July 13th.—R., 25; P., 90; T., 102, a.m.; 103·8, p.m. Enemata yielded a small amount of hard fæces. As the stud at the moment were receiving grass daily, a provisional diagnosis of botulism, or the "grass disease" syndrome, was made. He got down during the night and remained there.

July 14th.—The patient had to be raised by means of slings and was kept in them. R., 25; P., 90; T., 103. 25 c.cs. of anti-botulinus serum were given subcutaneously.

He was seen by Messrs. F. T. Harvey, F.R.C.V.S., and J. Brown, F.R.C.V.S., and the latter said that if he had examined the animal in his own district he would have regarded it as very similar to a case of "grass disease."

July 15th.—The patient was now much weaker, but took a little liquid. T., 104.

July 16th.—He had to be lowered and moved from the slings; when on the ground he appeared to be galloping in delirium. R., 50; P., 110; T., 105. Death took place at 5 p.m.

Throughout the course of the disease there was sweating, especially around the sheath and under the tail. The visible mucous membranes were of a brick red with a tendency to a yellowish tint. Enemata were given daily from July 11th. The treatment was more or less symptomatic. Length of illness about nine days.

Post-mortem Examination conducted at 9-30 a.m., July 17th. The carcase was in good condition. There were contusions on the off temporal region, arm and stifle. He had died on the near side. There was a small amount of yellow serum in front of each forearm. There were a few pieces of chaff between the cheeks and teeth on both sides of the upper molars. There were small abrasions of the tongue opposite the fourth molars, and small hæmorrhages on the external aspect of pharynx, around the jugular veins, carotid arteries and behind the trachea. The anterior portion of the floor of the pharynx was covered with a white pus-like deposit, and a similar material came out of the follicles on pressure. A few pieces of chop were present here. Immediately behind the epiglottis all the structures were of a dark red colour, even black at the entrance to the larynx. This colouration extended to a depth of one-sixteenth of an inch. The epiglottis was of a similar colour, but the severity of the changes gradually became less as the trachea was reached. The mucous membrane of this organ was slightly hæmorrhagic through-

out its extent. Both lungs were congested, the near one more so than the off. The right side of the heart was markedly dilated and its endocardium was almost black, especially at the auriculo-ventricular valves, to a depth of one-sixteenth of an inch. On the left side the valves were black and the endocardium of the ventricle was black in patches. The stomach contained water and chop in fair amount; the mucous membrane was hyperæmic. The mucous membrane of the small intestine for the first few inches was yellow and submucously there was a quantity of gas, giving rise to an irregular surface somewhat like crocodile skin. There were present a few large white worms (*Parascaris equorum*). The ileo-cæcal valve was a little thicker than normal and darkly stained. The contents of the cæcum were semi-solid. There were about a dozen almost black areas, each about the size of one's palm, on its mucous membrane. A few *Strongylus equinus* and *S. vulgaris* were present. The first portion of the double colon contained two balls of food about the size of an orange and numerous *S. edentatus*. The second and third portions had semi-solid ingesta, but in the fourth it was almost liquid. The mucous membrane of the floating colon was pale and like sponge cake, due to gas. The vena cava from just behind the liver was deep red in colour and about three times its usual calibre. The bladder contained a full amount of urine. An appreciable quantity of cerebro-spinal fluid escaped as the head was severed. The brain and anterior portion of the spinal cord were examined and appeared to be normal. The turbinated bones were almost black with contained blood and the ethmoidal mass was in the same condition. Death was regarded as having been due to a disease simulating botulism or "grass disease."

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The third case was the first that gave us a true picture of the condition. It came on suddenly without a history of sore throat, as in the first case, and it was not so acute as in the second, where all the essential symptoms were masked by "colic." The examination of this patient on July 11th left us in a state of uncertainty. The different features found made us begin to connect the three cases, but, apart from the food, we were at a loss to explain this connection. The animals had occupied stalls in different parts of the yard. The whole hygiene of the stable was examined; the nature of the work, places of working, and tipping; the carters, and the water supply, but without result. Several bales of hay and sacks of grain making up the diet were scrutinised for poisons, insect pests, moulds, and any other possible factor, without result. Here it should be stated that this stable prepared the food for two others under its control, one of seventeen van horses, and the other of twenty-two shires. There were no casualties at either of these. Moreover, the supply of food in bulk to all our other stables was from the same original sources.

On July 13th we considered we were justified in making a diagnosis of botulism or the "grass disease" syndrome. It should be explained here that the grass mentioned earlier was coming from a farm next to one where, in 1925, we had seen a case which was regarded then as being slightly affected with "grass disease." It was given slate powder in water, by the stomach tube and recovered. This treatment was suggested by Mr. H. Sumner, senior, M.R.C.V.S., and it was after having seen certain cases of his at that time that we were enabled so to diagnose this early case.

We thought the outbreak could be explained by some agency brought in with perhaps one special load of grass and it was hoped that with the measures taken (excluding any animals exposed to infection up to July 9th), we were about to see the end of the enzootic.

We now looked carefully into the accounts of "grass disease" given in the *Veterinary Record* during the last ten years. Despite the writings of many able clinicians and research workers we discovered practically nothing of help concerning the cause, treatment and prevention of the condition. We were left with the impression that the name itself was just as unsatisfactory—bearing, as it does, no relation to the cause, the symptoms, the lesions or the person who first described it.

Case 4.—Bay shire gelding, "Outram," sixteen years old, purchased 21st April, 1915.

July 29th.—He did not eat up his evening meal, and was given some magnesium sulphate in his drinking water.

July 30th.—He was not drinking properly, and was often chewing and yawning; he took one and a half gallons of water and three small buckets of damped food. R., P. and T. normal.

July 31st.—The patient's condition was about the same, but he was yawning a great deal. There was an amount of partially chewed food in the manger. T., 101. A diagnosis of parabotulism was now made. (See notes which follow this case.)

August 2nd.—He did not lie down during last night.

August 3rd.—He appeared to be more "tucked up." R. and T. normal, P., 56. He was seen by Professor Gaiger, who considered that the case might be one of botulism, but failed to recognise so-called "grass disease." Food was noticed to cause paroxysms of coughing on two occasions. There was a somewhat vacant stare.

August 4th.—T., 102. Food was often going the "wrong way," and much less liquid and solid were taken.

August 5th.—He could not drink although he wanted to; it was a very hot day. Tears were noticed running from both eyes. The visible mucous membranes were icteric. There was sweating under the tail. Coughing was observed when liquids reached the pharynx. The stomach tube entered trachea at each attempt to pass it. R., 14; P., 58; T., 102. The patient rested well. The urine and dung were apparently normal.

August 6th.—Death took place early in the morning. Length of illness about eight days.

Post-mortem Examination conducted at 10-30 a.m. on the same day. Part of third and fourth portions of the double colon were semi-impacted. The mucous membrane was stripped off in small patches, and was red in colour. A few strongyles were present. The small bowel contained a few areas of reddening. The liver appeared somewhat pale. The right lung was engorged with blood due to hypostasis. The first and last portions of the œsophageal mucous membrane were highly coloured. The pharynx and larynx were markedly hyperæmic and food was

lodging in the posterior nares. The bladder was about half full of urine containing flocculi. The brain and cord were not examined. The original diagnosis seemed consistent with the changes discovered on *post-mortem* examination. The stomach and its contents were reserved for further examination.

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The case just described was the fourth. It started twenty-one days from the commencement of, and thirteen days after, the death of the third case. Twenty days had elapsed since the supply of grass had been withdrawn. With the passage of this length of time, we were convinced that the cause, whatever it might be, was not being derived from grass, because in addition to the lapse of twenty days, grass had been given to ten other stables. It seemed evident that this yard contained some toxic agent which was not reaching the other two stables, which were being supplied with straw, chaff and sacked grain from the infected loft. The explanation of this fact will be forthcoming later.

On Sunday, July 30th, we noticed in the July number of *The Review of Applied Entomology* (p. 129) a reference to Sir A. Theiler and others' work on Lamsiekte (Parabotulism) in Cattle in South Africa. It stated: "Lamsiekte is a serious disease of cattle in South Africa, now known to be caused by a toxin produced by an anærobic saprophyte, provisionally named *Clostridium parabotulinum bovis*, that develops in carcases and is ingested by cattle impelled by osteophagia (induced by phosphorus deficiency in the soil and consequently in the vegetation) to eat débris of carcases."

That evening we consulted Edmonds (1), Seddon (2), and Theiler and others (3), and were convinced that in most of the essentials the condition we were dealing with was similar to theirs. On enquiry next morning, we found that about five weeks ago, *viz.*, approximately June 27th, about twelve rats, in a dried-up condition, were found amongst the oats then being used. This occurrence was, therefore, about a week after Case 1 had started. It was ascertained that a number of the oat sacks were damaged. From now (August 1st) onwards, all the animals were bedded on the straw, fed on the hay as chop, and given grain out of sound sacks only. Anti-rat measures were put into force.

It now appeared that the reason why the other two stables which were supplied with grain from this one did not get the disease was that, as the grain was carted to them, sound sacks only were used. It, therefore, appeared evident, and it was assumed, that very little toxin would reach the grain if it contaminated the outside of a sack.

At this point, the possibility of the presence of an inorganic or vegetable poison was carefully investigated, but the clinical, chemical and botanical findings did not agree.

Case 5.—Bay shire gelding, "Xiphidon," nine years old, purchased April 1st, 1924. He went out to grass on the sewage farm whence grass was derived for this stable, on May 4th, and returned in good condition on July 19th.

August 30th.—Came in from work at 4 p.m. R., 16; P., 60; T., 100·4. Tried to eat and drink but was only partially successful. Yawned a deal and rested his chin on the top of the lower half of the box door. Made a sucking sound when trying to drink. Examination per rectum was negative. Enemata were given. Diagnosis, parabotulism.

August 31st.—Had rested well, taking a little food and water. There was a marked "pleuritic ridge."

September 1st.—R., 14; P., 62; T., 100. The patient remained down a great deal, appeared sleepy and the abdomen was "tucked up." Wherever possible the head was rested on the attendant; the legs were tired and controlled badly. He staled without extension of the limbs or drawing of the penis. He lay down about 1-30 p.m., and was made comfortable with stuffed sacks.

September 2nd.—Died about 3-30 a.m. on his near side. Length of illness about three days.

Post-mortem Examination conducted September 3rd, at 10 a.m. Prior to opening the abdomen, half an enamel-bucket of blood was collected. The stomach was removed after ligation of both orifices. The mucous membrane of the cæcum for a distance of about one and a half feet from the tip was hyperæmic. The first portion of the double colon was almost empty and the mucous membrane appeared highly coloured and somewhat like the lesions of Johne's disease. There were a few strongyles. The second portion of the double colon contained a fair amount of ingesta about the consistence of a bran mash, and there was one *Oxyuris equi*. The mucous membrane was similar to that of the first portion. The floating colon showed several highly-coloured patches where fæcal masses had rested. These were very dry. The mucous membrane of the last three feet of the rectum was covered with a thin layer of mucus.

The bladder was full but not distended. The urine was clear, with flocculi. The neck of the bladder appeared to be somewhat highly-coloured. The left lung showed hypostatic congestion. The pericardial sac contained a small teacupful of sero-sanguinolent fluid. The larynx was dark red in colour and contained much froth. The rest of the tongue and floor of the pharynx were markedly hyperæmic with a little vegetable detritus adhering to them. The fifth and sixth upper molars on both sides appeared to be the seat of alveolar periostitis. The turbinated bones were almost black, due to engorgement, and the ethmoidal mass was in the same condition.

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Case No. 4 had started on July 29th and died on August 6th. The use of whole-sacked grain had been instituted on August 1st and nothing further happened until August 30th, when the fifth case became ill. Odd dead rats had been found in the hay and straw, but it appeared that after an immunity of one month perhaps a few damaged sacks had been emptied. With the exception of the straw, all the material in the loft at this stable was now withdrawn from use. (September 1st.)

During the next few days, the loft having been made rat-proof, a drive resulted in the capture of a large number of rats and the finding of a number of dried up specimens. Loose grain and that from damaged sacks was re-sacked and marked with a red cross.

Case 6.—Bay shire gelding, "Uzziah," eleven years old. Purchased November 30th, 1921.

September 1st.—He had worked all day and was said to be slightly lame in the near hind limb with a temperature of 106 at 6 p.m. First aid for lymphangitis was instituted.

September 2nd.—The lameness appeared to have practically gone. T., 102.

September 3rd.—Visible mucous membranes, yellowish tint. R., 14; P., 62; T., 102. He ate quite a bit but an odd quid dropped into the manger; he seemed to drink fairly well. There was a slight but distinct pleuritic ridge; not much sweating, and the penis was often exposed.

Diagnosis.—Parabotulism. At 8 p.m., R., 16; P., 64; T., 102.

September 4th.—R., 16; P., 64; T., 101. The muscles behind the shoulders were often "shivering." The legs seemed tired, or the equilibrium was somewhat disturbed. He was eating a little, but liquids were returned by the nose. Enemata were given and hard lumps of fæces were discovered in the rectum.

September 5th.—R., 18; P., 70; T., 101. Nasal mucous membrane very injected. The patient seemed "wobbly." Seen by Professor Gaiger. Lay down a great deal and was apparently much worse.

Oxygen was administered subcutaneously. He then went down and remained so until 11 p.m., when death took place.

Length of illness about four days.

Post-mortem Examination conducted at about 9 a.m., September 6th. The cæcum contained a few strongyles and the orifices were deeply stained. The first portion of the double colon was empty except for the last few inches, the second was full of soft food, the third contained liquid, and the fourth had soft ingesta with some grit and a few small pieces of wire. The floating colon had a little grit in it and there was patchy staining. The last portion (four feet) was dry and this condition extended into the rectum. The small bowel appeared bile-stained in its anterior portion and there were numerous hæmorrhagic spots about the size of a threepenny piece. The liver was very congested. The pericardium contained about a teacupful of blood-stained fluid. Both lungs had their apices very congested; there was froth in the bronchi. The endocardium, including the valves, was very stained on the right side of the heart and a little less so on the left side. The bladder was half full of clear urine. The trachea was very stained and full of froth. The larynx was deep red coloured. There was food in the pharynx, between the molars and cheeks, and in the posterior nares.

On opening the cranium, the left cerebrum shewed an area, the size of half a crown, of definite congestion and there were congested vessels on the left side of the bulb.

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The sixth and last case was undoubtedly infected before the food supply was obtained from another yard. It was seen by Professor Gaiger on September 5th, and to obviate any further possible risks of infection, at his suggestion, the straw was also withdrawn.

This animal started to show symptoms on September 1st and died on September 5th. From now onwards, no fresh cases occurred. Early in October, the disposal of the bedding and forage at this stable became a question of great economic importance. It was considered that all the facts pointed definitely to a neuro-toxin in the food.

The sub-stable, containing twenty-two Shires, was cut off completely from this yard; on October 14th, untreated straw from the infected loft was served out to the seventeen van-horse stable, and on October 15th, twenty-eight animals in the main yard were similarly supplied. The original unused chop, and grain from damaged sacks, were now mixed, placed in provender sacks and dropped into a clean tar-boiler with water at 100°C. and kept there for three and a half minutes. It was allowed to drain and was fed within forty-eight hours of immersion. It was found that the thin, loosely made sack, known locally as a grain sack, was too weak after being immersed in boiling water to support the weight of its contents, as it was lifted out of the tar-boiler. It was, therefore, necessary to place this grain into a stronger type, known as the oat sack. In addition to this, all the mouths were closed by means of coarse stitches, because the ordinary tie often slipped or was forced off owing to swelling of the soaked grain.

The seventeen van horses commenced with this food at dinner-time on October 15th, and the twenty-eight animals in the main yard started on it at tea-time on October 17th.

The resulting food was dark in colour and a little damp, but had a nice smell and taste; the animals ate it well.

No fresh cases having occurred by October 24th, that is to say in nine days, the remainder of the animals were put on the "de-toxicated" food. Bales of hay were boiled for three and a half minutes directly steam was up, at about 9 a.m. This used up most of the water. A second boil was then made and was ready for the sacked grain by about lunch time. Times were regulated by an "egg timer" and temperature by a brewer's thermometer.

After the hay and grain had drained, the hay was chopped and the grain mixed.

All was consumed within forty-eight hours of treatment, so that little or no toxin would have re-formed before ingestion. Up to the time of writing (November 21st) no further cases have occurred, no untoward effects have been noted, and the animals have kept their condition. A little extra care has been necessary to keep the mangers and nose bags sweet.

The cost of treating the hay and grain for over seventy horses by the method outlined above has been proved at just under £3 per week, of which thirty shillings was for extra labour, twenty-three shillings for coal, and six shillings for estimated cost of hire of the tar boiler and sundries. Roughly speaking, a cost of about £60 will have been incurred in rendering about £1,400 worth of possibly contaminated hay and grain apparently safe to use. This we consider a satisfactory solution to the problems of prevention and disposal of the food.

Miscellaneous Data.

1. Intervals elapsing between the commencement of cases —in days :—

Case 1.	*Case* 2.	*Case* 3.	*Case* 4.	*Case* 5.	*Case* 6.
—	13	5	22	33	2

2. Approximate lengths of illness :—

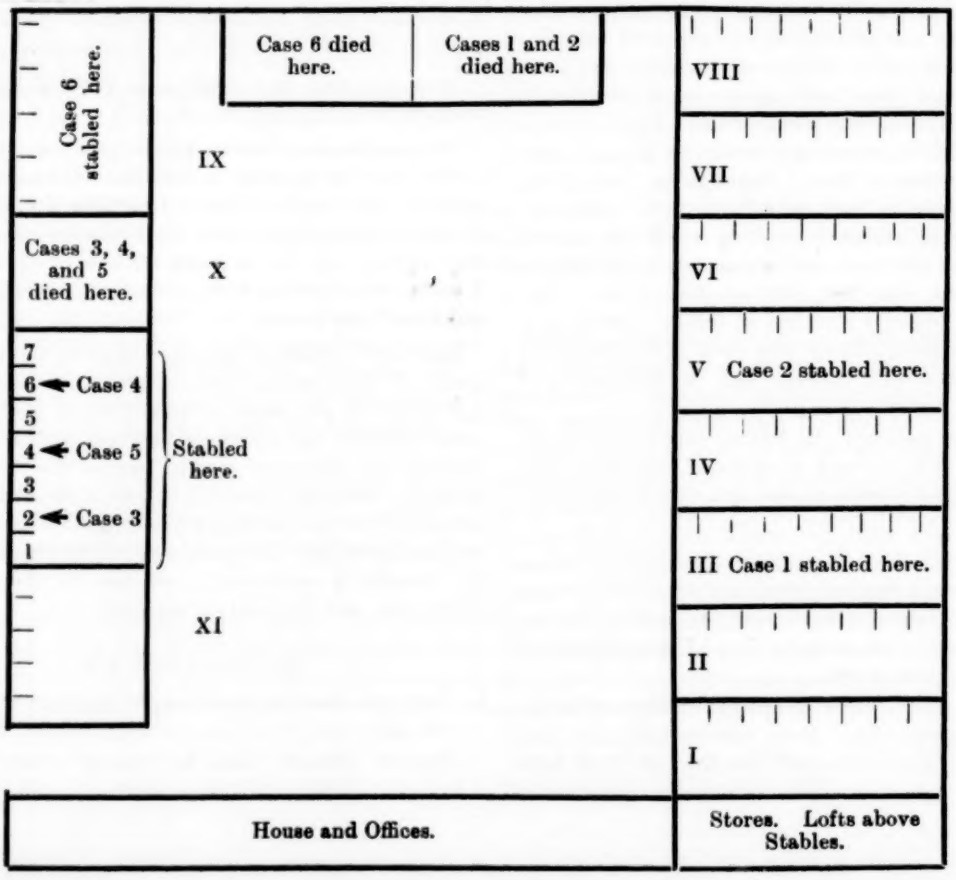
Case	1	...	...	9 days.
,,	2	...	...	9 hours.
,,	3	...	...	9 days.
,,	4	...	...	8 days.
,,	5	...	...	3 days.
,,	6	...	...	4 days.

3. All the carters were different, but Cases 3 and 4 were animals working singly and driven by the same man.

4. Diary of principal events :—

June	22nd.	Case No. 1 started.
July	1st.	Case No. 1 died.
,,	4th.	Case No. 2 started and died.
,,	8th.	Case No. 3 started.
,,	9th.	Grass supply stopped.
,,	16th.	Case No. 3 died.
,,	29th.	Case No. 4 started.
Aug.	1st.	Discovery of dead rats on June 27th came to light. Animals now to be fed on grain from whole sacks only.
,,	6th.	Case No. 4 died.
,,	30th.	Case No. 5 started.
Sept.	1st.	All hay and grain at this stable withdrawn.
,,	1st.	Case No. 6 started.
,,	2nd.	Case No. 5 died.
,,	5th.	Straw at this stable withdrawn.
,,	5th.	Case No. 6 died.
Oct.	14th.	Straw used for a stable of seventeen van horses.
,,	15th.	Straw used for twenty-eight horses in main yard.
,,	15th.	Seventeen van horse stable given boiled chaff and grain.
,,	17th.	Twenty-eight horses in mainyard ditto.
,,	24th.	All main yard placed on boiled chop and grain.

5. Plan of stable :—



There is no satisfactory explanation why three cases started in No. X stable, except perhaps that at this point the second barrow of food was usually just about to run out.

Bacteriological.

From mummified rats which were supplied to him on September 6th, Professor Gaiger made anærobic cultures from (a) blood-stained oats picked off them ; (b) rat bones ; and (c) live maggots. These proved fatal in small doses after three days' incubation to two guinea-pigs when sprinkled on their feed of oats and bran.

The *post-mortem* examination showed neither gastritis nor enteritis. The carcase of each showed a " dry " appearance, which Professor Gaiger has always associated with guinea-pigs dead from botulism, and the lungs of one showed apoplexy, a common feature at the *post-mortem* examination of guinea-pigs infected with botulism.

Further investigations are in progress.

Origin of the Outbreak.

We feel convinced that the origin of the disease was from rats, which may have carried the infection from carcases from a knackery 175 yards away in a direct line. There are certain points unconnected with the present outbreak which lend support to this view. Early in 1919, we started taking notes on cases of sudden death in cattle reported under the Anthrax Order, because it was felt that such might be of value in arriving at the causes. After each case had been proved to be " not anthrax," a careful *post-mortem* was made at the knackery in question. Whilst different definite causes of death could be assigned to many cases, the great majority were what the cowkeeper terms " inflammation," *viz.*, an enteritis or gastro-enteritis of unknown origin. After exhaustive enquiries we came to the conclusion that it was dietetic. Many diets were found to be unbalanced and rich in protein. Attempts were made to correct these. The clinical and *post-mortem*

pictures were regarded as depicting " protein " poisoning. An outbreak in a herd involving three newly-purchased cows, however, completely upset the protein poisoning theory. Being new, the animals were placed on hay and a small amount of bran; within a week all were dead. They were reported as anthrax ; we saw two alive and made *post-mortems* on all. After reading Theiler's and others' monograph on lamsiekte (parabotulism), we are now unable to separate these cases from many described by them.

Recently, too, we have had a bovine case related to us, where there was even protrusion of the tongue. The *post-mortem* examination which we saw was made at the same knackery. It seemed to us very like the African disease.

The remarks given under this section are somewhat out of place here, but they have been made to show that the possibility of infection from the source mentioned rested at least on some previous rough clinical observation. We feel, however, that this type of bovine disease merits the earnest consideration of the profession.

A point of some importance in connection with the origin of a disease due to a toxicogenic saprophytic anærobe is the prevention of dead animals harbouring the organisms in their alimentary canals getting amongst the food. The destruction of rats, therefore, by any of the poisons—chemical or bacterial—has certain risks. Some of these can, however, be got over by a knowledge of the rats' likes and dislikes with regard to sacked or heaped grain.

General Remarks.

As the cause has not been definitely determined, we cannot describe the disease we have been dealing with by the term botulism. We have little doubt, however, that it is identical with parabotulism of equines as described by Theiler and Robinson. This is due, according to them, to *Clostridium parabotulinum equi*, which Weinberg and Ginsbourg (5) call *Bacillus botulinus*, Type D. *Clostridium parabotulinum bovis* or *B. botulinus*, Type C., is the cause of lamsiekte in Africa and toxic bulbar paralysis of cattle in Australia. According to many workers, this bacillus may occur as a saprophytic anærobe in the intestines of many vertebrates, and when these die naturally or otherwise the organisms find a suitable protein substrate in which to manufacture the toxin. It has been shown by Seddon that the virulence of the toxin decreases as the anærobic conditions become less complete. This fact, coupled with the amount of toxin, seems to explain the peracute, acute, subacute and even chronic cases seen in diseases exhibiting what has been called the bulbar paralysis syndrome. " Grass disease " presents this syndrome, so do certain conditions seen in cattle and sheep. We are convinced from our enquiries since our cases that a number of deaths in horses, cattle and even sheep, have been due to factors similar to those at work in our cases. Although we have not seen a typical case of " grass disease " in its native haunts, we have gone somewhat fully into the literature, the most recent being Pool's (6) paper, of which we were fortunate enough to receive an advance copy. It seems to us that the symptoms of " grass disease " are very similar to those exhibited by our cases, especially when one takes into consideration how difficult it is to write up a case as it was actually seen. It is to be noted that " grass disease " becomes prevalent about the time that numerous small birds and mammals may be found dead, and moreover, Rutherford (7) has pointed out that the disease is less prevalent in wet summers. During such times, there are less flies to infect cadavers from any one nidus of anærobe activity ; there is more cover and less need of close grazing, and toxins may be driven below the surface of the soil. Our first views were that the disease we have described was of the nature of a toxic bulbar paralysis, but since reading Dickson and Shevsky (8), Edmunds and Long (9), and Cowdry and Nicholson (10), and going into the physiology of the cranial nerves and the autonomic system, there seems to us more evidence that the toxin acts on the nerve terminals. This seems to find support also in those cases where the degree of paralysis is slight. In our cases, the facial (VII) and the glossopharyngeal (IX) appeared to be constantly involved, but other nerves were affected in some of the cases. It appears to us that the action of the toxin on the peripheral endings of the motor and secretory fibres of the autonomic system, thus disturbing the balance between the sympathetic and parasympathetic systems, is an important factor in the explanation of many of the symptoms. With the actual organism undemonstrated and the term toxic bulbar paralysis being unsuitable, we think a name similar to that used in France and which describes the clinical features, to be the most desirable, *viz.*, labio-glossopharyngeal paralysis. The French condition, however, appears, according to Cadiot and Lesbouyries (11), to be more chronic than our cases and more closely related to " grass disease." Our lack of knowledge of the action of the toxins, made by the group of organisms now under consideration, upon the cranial nerves and the autonomic system hampers the clinician considerably. Some writers refer the symptoms to the VIth to XIIth nerves, because these arise from the bulb, others add the Vth nerve, whilst R. Moussu (12), referring to the ox, speaks of paralysis of the Vth, IXth, Xth, XIth and XIIth pairs, leaving out, it will be observed, the VIth, VIIth and VIIIth pairs. The close association of the cranial autonomic with the IIIrd, VIIth, IXth, Xth and the XIth pairs of cranial nerves appears to us, as we have already remarked, of considerable importance in interpreting the symptomatology.

The only other aspect of the outbreak upon which we wish to comment is that of differential diagnosis. It will be seen that we confused our early cases with "sore throat," " quidding," due to defective teeth, and " colic." That is only likely when one comes across the disease for the first time. We saw no resemblance whatever between our cases and those described in this country as epizootic cerebro-spinal meningitis, or as Borna disease on the Continent. R. Moussu (*loc. cit.*) has given an excellent clinical and experimental account of this disease under the title of " Enzootic Encephalitis of the Horse." In an outbreak which one of us (A.W.N.P.) watched with the late Mr. T. Shepherd, M.R.C.V.S., in 1913, there was excitement in some cases, inco-ordination in others, or a combination of these, giving rise to the typical cerebral, spinal and mixed forms as described in textbooks. It must, however, be pointed out that in one of Moussu's experimental cases, just before death the lips, tongue and pharynx appeared to be paralysed.

On reading over the manuscript of this paper, it has occurred to us that a brief general account of these cases given as a kind of composite case, would be of value.

The earliest signs are so indefinite that the condition will not be diagnosed unless some special reason for suspicion exists. Inability to deal adequately with food and water, with an absence of fever, is one of the earliest signs. The patient may be noticed to take a long time over a meal, or without warning may be unable to eat anything save the smallest quantities. Chopped material may be partially masticated and dropped either among the bedding or in the manger. In the former case one may wrongly conclude that solids are being taken. Long hay is grasped readily enough, but repeated attempts to draw it between the molars fail, and the patient stands with the free ends sticking out from the corners of the lips. Salivation may accompany the attempts at mastication, but is not an essential feature. When water is offered, attempts to drink are eager, but the ears do not move in the normal manner, there are no definite swallowing movements, the nostrils may be submerged and the cheeks drawn in somewhat. If the height of the water is marked on the side of the bucket before drinking, it will afterwards be found that the level of the liquid has only been lowered a very little. The belly is soon slightly "tucked up." When led out, the gait suggests early tetanus. It varies from a slight to a marked degree of stiltiness. In the stable the patient may stand quiet; sometimes there is a desire to rest the head on any available object; or there may be restlessness. There is no stiffness of the muscles and the membrana nictitans is not shown. The masticatory failure does not arise from tetanic rigidness of muscles but from inability of the tongue and cheeks to regulate the movement of food to its proper position in the mouth and to swallow such food as is chewed. A significant sign is a tremor of the surface muscles, particularly those of the shoulder region.

Stasis of the bowels may exist and mucus-coated fæces may be discovered either by rectal examination or after natural passage. There may be no evidence of stasis; in one case impaction was the most obvious feature. The pulse rate is usually increased, sometimes very markedly. The strength of the pulse is fairly good, but the type is not characteristic.

Protrusion of the penis and slight sweating are fairly constant.

At *post-mortem* examination the significant features are: food lodging between the molars and cheek; inflammation of the pharyngeal region extending into the larynx and posterior nares, with intense congestion of the turbinate bones; contraction of the pyloric sphincter and, therefore, a liquid content of the stomach; evidence of some degree of stasis in some part of the large bowel; a membranous mucus covering of some of the contents and a dry state of the bowel wall; patchy inflammation of a mild degree in any part of the bowels, and a distended bladder.

It is not possible in a communication of this kind to discuss the known bacteriology and immunology of the botulinus group of organisms. Those who desire such information will find it in the works which we have listed at the end of this paper. Although dealing with the bovine aspect of the disease, Theiler's and others' (3) work, which occupies more than five hundred pages, will be found to contain nearly everything that the veterinarian is likely to require. It may, however, be stated briefly that these organisms are spore-forming saprophytic anærobic bacilli, which form highly potent toxins, capable of gaining access to the nerves by way of the alimentary canal. Their isolation in pure culture is a matter of great difficulty and takes a considerable length of time to accomplish. In many ways the toxin and antitoxin resemble those of the tetanus bacillus. The questions of the use of a vaccine or serum in treatment and the employment of serological tests in diagnosis are likewise somewhat similar.

In conclusion, it is likely that many points left untouched by us will be considered by others worthy of discussion. It will be our aim to deal with these should any one present favour us with his criticism.

Addendum.

Case 7.—Bay shire gelding, "Umbriel," eleven years old. Purchased November 30th, 1921. Standing in Stall No. 2 in No. X. stable.

December 9th.—On returning from work did not eat up. T., 102.

December 10th.—R., normal; P., 55 and somewhat irregular; T., 103. He ate and drank a little, and it was not possible to make a definite diagnosis.

December 11th.—R., normal; P. as on the previous day; T., 101. There were two small quids in the manger. Water returned by the nostrils, but he could eat and drink a little. Diagnosis, "parabotulism."

December 12th.—R., P. and T. as on the 11th. The conjunctiva had a yellowish tinge. He was "quidding" markedly, but ate carrots fairly well. He was given 16 grammes of hexamine in 150 c.cs. of water subcutaneously morning and night. Professor Gaiger saw the patient on this date.

December 13th.—The general condition was about the same. The previous day's treatment was repeated. He was lying down well, passing urine, and the penis was occasionally protruded. The rectum was emptied every day as he did not appear to be able to carry out this function himself. When eating there were sometimes paroxysms of coughing, and chewed food was expelled. T., 103.3 in the evening.

December 14th.—The condition was about the same as on the previous day. The hexamine was reduced to one dose of 20 grms. daily. T., 105.2 in the evening. Enemata were now given twice daily and the daily treatment with hexamine continued until December 17th.

December 18th.—The conjunctiva was less icteric. The patient appeared much better, there was less coughing and he took more food, carrots and water. From now onwards the rectum was emptied every other day.

December 21st.—He had a normal passage in the bowels and was walked out of his box.

December 22nd.—Doing well. R., normal; P., 50, but a little irregular; T., 101. Ate and drank well. Exercise ordered.

December 23rd.—Taken with "colic" suddenly at about 1 p.m. Although it could not be detected per rectum, a diagnosis of twist was made. Those portions of the large bowel which could be palpated were not impacted.

December 24th.—Died about 2-30 a.m.

Post-mortem Examination conducted at 11-30 a.m., revealed a complete twist at the commencement of the right ventral colon (1st portion) and the termination of the right dorsal colon (4th portion). The whole double colon was thus cut off and its vessels and walls were markedly engorged. The contents of each portion were quite soft and fluid-like.

The pharynx and larynx appeared somewhat darker than normal with a yellow tinge suggesting repair. There were no other lesions of importance.

* * *

After this case had been diagnosed a careful inquiry was instituted into the methods of prevention which had been put into force. In the end it seemed clear that the only possible defect was with regard to the sweepings. It has been previously pointed out that the " damaged " oats which had been put into thin sacks had to be placed in stronger ones. This operation was carried out in the loft on the right of the hoist door. After boiling, the grain and chop were mixed on the left of the door. Although most of the spilled grain was re-sacked we feel sure that some of it got on to the prepared food.

We have not given the duration of this animal's illness because we consider that it was convalescent on December 21st. The *post-mortem* justified this conclusion, for there was no evidence of stasis, or closure of the pylorus.

Hexamine was used because R. Moussu (*loc. cit.*) obtained such excellent results with it in the treatment and prevention of epizootic equine encephalitis (epizootic cerebro-spinal meningitis). He believed that it destroyed the filtrable virus of the disease, although, like some other specific preparations, it had no action *in vitro*. We do not make any claims for it, save to mention that six consecutive cases died, but the seventh which was put on this drug, we maintain, recovered from the disease. We are not prepared to go deeply into the relationship of the twist to the antecedent labio-glossopharyngeal paralysis, because we can find no records of such cases dying of twist. We have seen horses at rest die of similar twists, and there is no reason why this should not have happened in the present case.

Although the occurrence of the disease in this animal was disappointing, it has to be remembered that we had to deal with £1,400 worth of " damaged " feed and bedding. If it is argued that the twist was due to the previous disease it can be pointed out that it is economically sound to lose one animal of six years' service, seeing that about one-third of the food and litter had been used up to the time of his death.

There have been no further cases up to the time of proof correcting (February 28th, 1928). All the hay and straw has been used and the value of the grain still to be used is about £400.

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Discussion.

Professor W. A. Pool: It is a very great pleasure to be invited to a meeting of the Lancashire Division of the N.V.M.A. and to open the discussion on such an interesting and important subject as the one we have before us to-day.

The essayists have attached great importance to their belief that the disease they encountered resembles both botulism and the " grass disease " we know in certain parts of Scotland.

Before making comparisons, it will be convenient to consider certain aspects of these diseases and show the relative importance that can be given to the various points upon which arguments can be based.

" Grass disease " occurs in three main types. A classification is shown upon the sheet circulated (Table I). This can serve as a working definition. Many critics would modify it and many items could be added to it. Additions or deletions would change the relative importance of those already given a place.

* * * * * *

TABLE I.—" GRASS DISEASE."

Peracute Type.

Death within twenty-four to forty-eight hours. Food and water refused. Oesophageal spasm and regurgitation in many cases. Rapid pulse at some stage. Temperature variable, but with no marked tendency to pyrexia. Sweating in later stages. Retention of urine. General loss of bodily tone. A stage of salivation in practically all cases. Abdominal pain of varying degree. Complete intestinal stasis.

Acute Type.

With complete impaction. Death within six days. No food taken. Water refused at first but in later stages fluids may be swallowed with a varying degree of difficulty. Oesophageal spasm and regurgitation frequent. Pulse 80 to 120. Temperature variable in the early stages without marked tendency to pyrexia. Later stages afebrile. Sweating towards the end. Tremors of the muscles of the shoulders and quarters. Snoring respiration. Retention of urine in many cases. General loss in bodily

tone. Salivation at some period. Varying degree of abdominal pain. Complete intestinal stasis.

With incomplete impaction. Death within twelve days. Food and water usually refused. Difficulty in swallowing, which is especially apparent with dry food. Oesophageal spasm and regurgitation common. Motions irregular, dry and small in amount. Pulse 65 to 80. Temperature variable in early stages, but without marked tendency to pyrexia. Later stages afebrile. Sweating towards the end. Tremors of the muscles of the shoulders and quarters. Snoring respiration. Retention of urine in many cases. General loss in bodily tone. Salivation frequent in early stages. Varying degrees of abdominal pain. Marked emaciation after five or six days. Abdomen soon becomes markedly " tucked up." Posture—hind legs under body, back slightly arched, quarters sloping sharply and tail held tightly into perineum.

SUBACUTE TYPE.

Illness of fifteen days or over. Appetite usually present. Marked lack of thirst. Swallowing of dry food always difficult. Deglution of liquids may or may not be accomplished with difficulty. A varying degree of œsophageal spasm is usually intermittently present. Bowels sluggish. Unformed motions passed once daily or once every two or three days. Pulse rate slightly increased. Temperature normal or subnormal. Intermittent sweating, especially under the mane and tail. Tremors of the muscles of the shoulders and quarters. Snoring respiration. Varying degree of difficulty in micturition. Increasing muscular debility. Lack of salivary secretion in response to dry food. Food chewed slowly and clumsily and ultimately allowed to fall from mouth. Abdominal pain usually occurs at irregular intervals, but is absent in some cases. No degree of impaction of the colon as a rule. Pendulous penis in males. Very rapid and marked emaciation. Abdomen becomes tucked up to an exaggerated degree. Anal sphincter spastic. Retention of fæces in the rectum. Posture—hind legs under body, back slightly arched, quarters sloping sharply and tail held tightly into the perineum.

. . . . . .

The disease occurs in certain parts of the North-East of Scotland. Odd cases undoubtedly occur in other areas, but only in more or less isolated instances.

Records of the number of cases that occur have been collected and this amounts to about 600 cases a year. It is certain, however, that many cases occur which are not reported.

In the peracute cases and the acute cases with impaction, the pyloric orifice of the stomach is closed. The stomach becomes very distended with water or saliva swallowed or secretion produced, because nothing passes out. This accounts for the regurgitation and vomiting which are such important features of these cases.

The small intestine is almost empty, or a few coils may be distended with gas.

The large intestine shows a complete impaction with perfectly dry matter of an almost cement-like consistence. The ileocæcal valve is apparently closed. The stomach, small intestine and large intestine are thus temporarily three systems without continuity.

A colleague and I have recently tabulated the details of every case of which there is a record that an equine animal has been given botulinus toxin. Many of the experiments recorded were undertaken before it was recognised that there is more than one serological type of *Bacillus botulinus*. Many of the cases were very casually observed, death or survival being the limit of observation of some authors.

There are records of nearly ninety cases in which toxin alone was administered, but in thirty-three of them the serological type of toxin given cannot be traced.

Careful study of this data shows that although there are differences in the susceptibility of the different species of animals to the different types of toxin, there is no striking difference in the syndrome of the disease set up by either type of botulism in horses.

In horses, loss of appetite, dulness and difficulty in swallowing are usually the first signs of botulism. The transition from apparent health to the stage of visible illness tends to come on rather quickly, even when the period of incubation is prolonged. In the acute cases the animal rapidly progresses from the stage when there is uncertainty if the illness has really started, to an advance stage in which there is difficulty in swallowing and prostration with a tendency to lie flat on the side.

There is a great tendency for the tongue to attain such a degree of paralysis that it hangs out helplessly with the tip beyond the level of the incisor teeth.

Subacute cases may remain standing for a considerable period and of course there may be recovery, but, even so, the general tendency in botulism is to the development of extreme prostration and the assumption of the decumbent position.

Rapid wasting is an almost constant feature in cases that live more than a few days.

Tocher and his colleagues advanced the theory that "grass disease" is botulism.

It would appear that their initial reasoning was that in human beings affected with botulism, difficulty in swallowing, constipation, wasting, prostration and muscular weakness are important symptoms. These symptoms occur in " grass disease." This evidence, combined with the fact that negative results had been obtained in earlier bacteriological investigations, therefore appeared to suggest that it would be worth while to search for *Bacillus botulinus*.

Their bacteriological methods are described by Dr. Williamson Tocher, who undertook this part of the work.

He said " blood, spleen and cerebro-spinal fluid were removed from these cases with as strict aseptic precautions as could be observed under the circumstances. As we had at no time been able to isolate an ærobe which could cause this disease from any of the tissues, the spleens were used for the cultivations of anærobic organisms. The procedure was as follows : the spleen was plunged in boiling water for about three to five minutes to destroy all surface contamination. The organ was then cut up with aseptic precautions into small pieces. These prices were placed in test tubes containing two per cent. glucose broth, heated for 20 minutes at 80°C. and incubated anærobically in M'Intosh and Fildes jars."

Such technique is not, of course, admissible.

There is no record of the manner in which the spleens were handled prior to the immersion in the boiling water and I think that, from the context, one is entitled to assume that the surfaces of the spleens were very far from sterile. If this assumption is correct, banal sporulating anærobes were absolutely certain to be present. *B. botulinus* was even likely to be present as a contaminant in such circumstances.

Immersion of a spleen which has been lying at room temperature would soon reduce the temperature of the water so that it would be less than 100°C. The spores of the anærobes commonly present in such situations are resistant to heat and no bacteriologist will admit that the technique described could have provided conditions for the destruction of all the contaminants on the surface of the pieces of spleen placed in the tubes of culture media. An entirely different technique is adopted to sterilise the surface of an organ.

The subsequent work of identification of the sporulating anærobic bacilli obtained in the tubes of culture media inoculated under these conditions cannot be accepted. The bacteriologist who puts forward a claim that he isolated *Bacillus botulinus* in such conditions has to provide very exact data on all points and this has not been done.

This claim has never been verified by any subsequent worker. Repeated attempts to demonstrate *Bacillus botulinus* in the tissues of horses affected with " grass disease " have yielded negative results in the laboratory with which I am connected.

Study of the effect of botulism on horses shows that in some respects it is very different from the disease seen in

TABLE II.—LIVERPOOL DISEASE.

	"Grass Disease."	Botulism.	Borna Disease.	1.	2.	3.	4.	5.	6.	7.
Mania	Very rare	Absent ...	Common	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent
Excitement	Rare ...	Uncommon	Common	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent
Real paralysis of locomotor system	Absent ...	Doubtful	Present ...	? ...	Absent ...	? ...	Absent ...	Absent ...	? ...	Absent
Extreme muscular weakness (as seen in botulism) ...	Absent ...	A striking feature ...		? ...	Absent ...	Present ...	Absent ...	Absent ...	Absent ...	Absent
Extreme prostration, resulting in permanent decubitus without abdominal discomfort ...	Absent ...	A striking feature ...		? ...	Absent ...	? Present	Absent ...	Absent ...	?	Absent
Tendency to remain standing till near death ...	Present ...	Absent ...	Absent ...	Absent ...		Absent ...	Present ...		? ...	
Ability to rise when decumbent in the later stages	Present until near death ...	Absent ...	Absent ...	Present ...	? ...	Absent ...	Present ...	Present ...	Present ...	Present
Paralysis of tongue so that the tip hangs below the level of the incisor teeth	Absent ...	A striking feature ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent
Vomition	Common in per-acute and acute cases	Not recorded	Absent ...	Absent ...	Present ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent
Complete impaction of colon	A striking feature in peracute and acute cases ...	Rare ...	Doubtful	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent
Difficulty in swallowing	A striking feature ...	A striking feature ...	A striking feature ...	Present ...	No evi-dence ...	Present ...	Present ...	Present ...	? Present	Present
Colic	A striking feature ...	Absent ...	Does occur	Absent ...	Present ...		Absent ...	Absent ...	Absent ..	Present
Spasms of groups of muscles of head and neck ...	Absent ...	Absent ...	Present ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent ...	Absent
"Grass Disease" posture	Almost constant in subacute cases ...	Absent ...								

man. The ophthalmoplegia and constipation seen in man are not features of botulism in horses.

Dickson and Shevky claimed that in dogs, cats and rabbits, botulism is attributable to depression of the parasympathetic system. Greig claimed that acute "grass disease" is due to stimulation of the sympathetic system. Study of the effect of botulism on horses shows that neither a depression of the parasympathetic system nor stimulation of the sympathetic system could explain the phenomena. Even so, Tocher and his collaborators claimed that "grass disease" is botulism.

Difficulty in swallowing occurs in some degree in many equine ailments. It is a striking feature of "grass disease," botulism and Borna disease and has also been noted in instances where illness has been produced from eating certain poisonous plants and mouldy fodder.

Authors describing cases in which difficulty in swallowing occurred have generally specified the exact organ which was affected, naming the œsophagus, pharynx or tongue, etc. In most cases it is exceedingly doubtful if such statements were justified.

Paralysis of the tongue, especially, has been mentioned by different authors. After one has seen real paralysis of the tongue in horses affected with botulism, it is clear that authors using that term in other conditions in which difficulty in swallowing occurred, were at least partly in error.

Hutyra and Marek describe a progressive bulbar paralysis in horses which occurs in Belgium and is considered to be due to eating white beets.

Cadiot, Lesbouyries and Ries, in their text book, describe the same condition under the title of labio-glossopharyngeal paralysis. The disease runs a chronic course: there is difficulty in swallowing, quidding, lodgement of food between the cheeks and molar teeth, salivation and protrusion of the tip of the tongue beyond the incisor teeth.

This condition of the tongue is very different from the disorder seen in the Liverpool cases and they are also termed "labio-glossopharyngeal paralysis."

It appears to be likely that these Continental cases are manifestations of the chronic form of botulism.

The whole question of the nervous disorder present in these equine cases in which there is difficulty in swallowing requires investigation.

It would be most interesting to learn the extent to which difficulty in swallowing occurs in horses as a feature of miscellaneous diseases in different parts of the country. It is to be hoped that practitioners will publish their experiences of this question.

It is very difficult to base an argument on the etiology of cases of the nature of those encountered in the Liverpool outbreak on such a small number as half a dozen, especially when such wide variations are shown.

If any half a dozen consecutive cases of "grass disease" were studied alone, no dogmatic statement could be made with regard to the nature of the syndrome.

With such a wealth of clinical experience as is available, however, in the affected area in Scotland, one is entitled now to form a conception of the disease in all its aspects. Practitioners in that area will each, in many instances, have seen twenty to eighty cases a year for over a decade. The sheet circulated (Table II) shows a comparison of some of the important features of "grass disease," botulism and Borna disease with the Liverpool cases. It is to be understood that, in the table, generalities are relied upon for the description of the characters of the former diseases. Many cases of either of these diseases would fail to pass a test based on these lines. At the same time, there appears to be strong reason for saying that collectively the Liverpool cases showed marked variations from all three diseases.

If difficulty in swallowing is eliminated from the Liverpool cases there is very little suggestion of either "grass disease" or botulism. As we have already pointed out, difficulty in swallowing is a symptom which probably occurs in diseases other than "grass disease," botulism and Borna disease more often than is realised. Absence of regurgitation, of vomition, and of impaction of the colon from all the cases is a very striking difference between them and "grass disease," considering the duration of the illnesses.

Absence of real evidence of paralysis of the tongue in any of them and of a general tendency to such extreme prostration that the decumbent position was adopted at an early stage and maintained till death, suggests that the disease was not botulism.

The authors' reiteration of the term "parabotulism" is, I think, quite unjustifiable. The only reason for the use of this term is that the rats were found in what one must now term, in view of the brilliant work of Theiler and his collaborators, the classical circumstances. This particular piece of evidence in connection with the Liverpool outbreak is intriguing, but it is not conclusive.

The essayists are not always strictly logical in their arguments.

They first suspected "grass disease" because cut grass was in use. They suspected botulism before they found the rats. This discovery permitted them to take a stronger grip than ever of their "grass disease" *cum* botulism theory without any qualms as to relevancy.

If rat cadavers produced botulism at all commonly, I am afraid motor transport would be universal in spite of all efforts of horse lovers, and I even fear that the existence of motor transport itself might be threatened because the human workers connected with it would themselves be dead of botulism.

To sum up :—The Liverpool cases do not appear to have been "grass disease." It is very doubtful if they were botulism. It is more likely that they were due to a hitherto unknown agent capable of causing difficulty in swallowing as the most striking symptom. There is urgent need to search for agents capable of killing horses with an illness of this type. The two most likely agents would appear to be a toxicogenic microorganism or a poisonous plant. It is quite likely that when found the agent would be merely one of a group.

It now remains to discuss the way the Liverpool outbreak was handled. Here, I think we will be on common ground. The losses were unusual and serious. The problems to be solved were amazingly difficult. The foresight, care, ability and energy with which the possible causes were examined and eliminated were examples of the efficiency of the modern veterinary public health official and show with what confidence tha public can leave that department of sanitary science in the hands of their executive Veterinary Officers. I congratulate the authors on their achievements. (Applause.)

Mr. W. NAIRN remarked that he would say quite frankly that he did not like the name "Labio-glossopharyngeal paralysis" given to that disease; it rather suggested a localised condition due to degenerative changes in the appropriate centres than a generalised toxæmia exhibiting disturbances of function in other parts than the mouth and throat. The throat symptoms might be the dominant symptoms, but he felt that though they got rid of any lack of function in that part, the animal would still die from the depression of metabolism generally, due to the general intoxication.

In acute cases of "grass disease" impaction of the bowels was the dominant feature, but though they succeeded in getting rid of that in some cases, they did not cure the condition, merely prolonging the case. In the report of the authors under consideration on Case 1, they stated that the cause of death was paralysis of the pharynx. One really expected a more accurate use of terms, and although not such a striking case it recalled a certificate he received recently from a meat inspector stating that he had condemned the carcase of a young bullock as it was affected with paralysis.

Continuing, Mr. Nairn said the dominant impression left on his mind after reading the paper was that the essayists were fine specimens of the optimists they all delighted to meet in life, but who, in the realms of science, caused a lot of trouble. They had described, named and fully explained all about the disease, and yet at the end of the account they were left unconvinced that they really knew anything about it, as they gave no evidence to convince

them. They did insert a query mark after " Botulism " at the top of the paper, but by the time they got to the end all doubt had vanished. The accuracy of the diagnosis of botulism should not be long in doubt, and surely with such an abundance of dead rats, they must have tested them for the classical test of botulism. The paper, he said, was silent on this point.

He wondered if the essayists tried to make any washings of grain where rats were found, or did they feed any rats' fæces ? If these cases were due to botulism they did not seem to belong to any of the groups hitherto recorded, nor did they show any resemblance to experimental botulism. They showed too much disturbance of pulse and temperature, also impaction of the bowels, which was not a feature of botulism. Not even one case showed the usual marked paralysis of tongue and the rapid loss of muscular control which was such a feature in Theiler's botulism, Seddon's parabotulism and also experimental botulism.

He might be wrong, but he gathered that the essayists were quite satisfied that " grass disease " in Scotland was also botulism. A really close and impartial study of " grass disease " permitted no other conclusion than the one that it was a distinct entity, and had neither a connection with cerebro-spinal meningitis nor botulism. That was no occasion to dilate on the symptomatology of " grass disease," as that had been published on several occasions, but he would like briefly to point out that among cases living as long as the Liverpool cases, they might find two types, namely those with distension of the abdominal cavity and those without.

In the cases with distension the horse might look well for a day or even four or five days, according to the rapidity with which he filled up. The horse was also alert and interested in his neighbours, but did not eat, drink or defæcate. The animal's pulse might be 80, 100 or 120 and his temperature 101 or 102 ; sooner or later he became distressed, due to the desire to eject fluid from his stomach. After they started vomition they died within twenty-four hours. The *post-mortem* examination showed a stomach filled with fluid and the bowels very dry and impacted. These cases at the end would drink easily after vomition started, and almost to the end the horse could get up and down.

The cases without distension—and seemingly those were the cases which the essayists assumed resembled the Liverpool cases—did not fill up ; the stomach never became distended and usually there was slight bowel movement. They might die in acute pain in a week or ten days, but usually lived from three to six weeks and died of complete exhaustion, going down a day or even two before death. They could always drink and take soft food, but dry food worried them as there was no salivary secretion. The taking of water and food frequently set up spasms of the œsophagus, due to the excessive action of the inhibitory nerve supply.

These symptoms of choking had been described by some as evidence of paralysis. The same disordered functioning of the sympathetic supply of the alimentary canal accounted for the symptoms of abdominal disturbance seen when subacute cases ate a small quantity of food. This discomfort seemed to limit appetite considerably. An alteration of gait, said to resemble early tetanus, was mentioned by the essayists. This was certainly not seen in " grass disease," but in these subacute cases there was always a definite crouching posture assumed ; the croup was pulled down and the tail kept tightly between the hind legs, and these were drawn forward under the body. In conclusion, Mr. Nairn said he would like to add his quota of thanks to the essayists for the occasion which had enabled him to make " these few disgruntled remarks."

Professor GAIGER, having referred to a meeting some ten years ago on the subject of botulism when, he said, after five hours' more or less heated argument the meeting finally disposed of the contention that " grass disease " was botulism, stated that what they were really interested in that afternoon was, what were these Liverpool cases ? If they referred to page 9 of the pamphlet they would see that, with regard to one of the cases, " He was seen by Professor Gaiger, who considered that the case might be one of botulism, but failed to recognise so-called ' grass disease.' " Those were his own words, added the Professor, and he asked the essayists to use them. He thought the case might be diagnosed as botulism, but it was only " might," and he did not see any clinical symptoms of " grass disease." They were up against considerable difficulties in diagnosing all cases of that kind. What was " grass disease ? " Those who were familiar with " grass disease " would claim that they could give a fairly accurate opinion, but they could not go further without a laboratory diagnosis. If they could say definitely that it was so the whole question of whether these Liverpool cases were " grass disease " would be solved, but they had no such test. They would see what Mr. Brown said with regard to another case on page 6 ; he said that " if he had examined the animal in his own district, he would have regarded it as very similar to a case of " grass disease." That was going a great deal further, said Professor Gaiger, than he himself would be prepared to go. In his view, there was no question that all of these cases were not cases of " grass disease."

They then came to the question of botulism, and that was a difficult question to answer. When they made cultures from grain and rats and blood they did not get much, but had they had the money to carry out experiments on these cases it would have been very interesting. They would, however, have to be on the lines suggested by Professor Pool that grain should have been washed or rats' bones washed. It would be of great importance if they could show that toxin was present in the grain, but owing to the lack of cash they were not in a position to do it.

To his mind, the question of what these cases were was even more difficult than what he pointed out, because the horses were getting grain. They had excluded the possibility that these cases might have been due to some vegetable poison. Professor Whitehouse had informed him that these symptoms were typical of aconite poisoning, and that happened to be another possibility. The sum total was that one could not say what these Liverpool cases were ; they could not note a few symptoms and say that because some were present in " grass disease " and some in botulism that the condition was either or both. He did not agree with the authors in saying all in one breath it was either " grass disease " or botulism ; they had considered that the two diseases were one, but he (the Professor) did not think so. It remained a very open question as to what the cases were. The fact remained that it was an overwhelming testimony to the officers who dealt with the cases, that after the steps they did take, the cases ceased. He congratulated the authors on their paper and Professor Pool on the way he had opened the discussion.

Mr. R. HUGHES remarked that he had no contribution to make to the discussion, except to express his appreciation of the labour and trouble the authors had taken in the preparation of their most valuable paper. He really did not know what " grass disease " or botulism was, because there were no regular or definite symptoms in each case.

Mr. G. MAYALL said he had been quite delighted to read the paper of the authors and to hear Professor Pool. If the paper had done nothing else it had done good in bringing them there. He thought there was a fair amount of evidence to support the conclusions of the authors, but there were several things in it about which he would like to know something. What, for instance, did the authors consider was a vehicle of contagion in these cases ? Was the disease conveyed by food soiled by the excrement of dying and diseased rats, or by discharge from the orifices of dead and diseased rats ? Did the infection enter by the nose or the mouth ? In a case which he reported in the *Veterinary Journal* for July, 1927, one of the noticeable features was that reddish-brown scabs kept falling down the nostrils, but they could find no lesions in the nasal mucosae when examined with a torch. Joest believed that in the Borna disease the virus gained entrance to the brain through the lymph vessels of the nasal mucous

membrane. He asked whether in the cases reported there was any paralysis of the muscles of the eyes or dropping of the upper lid or impairment of sight, as those were marked symptoms of botulism in the human subject. They knew how many diseases were communicated from animal to animal by fæces; fowls got tuberculosis from following pigs; chicks got bacillary white diarrhœa and coccidiosis from droppings of diseased chicks, and he thought he had seen coccidiosis communicated to puppies that licked up the droppings of diseased pigeons, while cattle were sometimes badly affected with avian tuberculosis, probably due to licking up fowl droppings from the manger. All these things showed that diseased fæces were dangerous.

On the other hand, he had personally known a large stable which, many years ago, was badly infested with large numbers of rats, which ran about the mangers and food and were finally got rid of by trapping the drains, blocking all holes up with broken glass and cement and the regular and systematic use of wire traps. No virus or poison was used to destroy them, and during the period of heavy infestation of the stables, no cases of botulism or Borna disease, or what had quite recently been called "*Encephlopathia endemica*," occurred.

There was little doubt that cattle and sheep might be infected by the same specific nerve poison as horses. Not so long ago a veterinary surgeon who lived in a "grass disease" district, expressed an inclination to send him (the speaker) an article on "Grass Disease in Cattle." Recent investigations in Germany led Earnst and Hahn to believe that cases of malignant catarrhal fever in cattle were due to Borna disease, and the source of infection probably through inhalation. Mr. Mayall added that some time ago he asked, in the *Veterinary Record*, whether Borna disease was "grass disease," but got no answer to the question. He fully recognised that it often was easier to ask questions than to answer them, but he enquired if, in this disease, the injurious agent was an anærobic bacillus, a diptococcus, a streptococcus or a specific and as yet unascertained nerve poison that circulated in the cerebro-spinal fluid.

Mr. BURNDRED said he was rather diffident in mentioning his own cases because they were rather different. One was the case of a pony which, owing to trouble in the hind fetlock, had gone down in the night. The next morning he got there and found two more horses affected and they had gone down by ten o'clock, he having arrived there at 5 o'clock. Another veterinary surgeon was called in and he suspected poisoning, and some of the organs were sent to the Royal Veterinary College in London with samples of their kind of food. He suspected botulism or food poisoning and decided to get an anti-botulism serum One horse lived two days longer; and the other recovered; two horses that did not have the same food did not go down at all.

Mr. W. WOODS said he had only seen three cases in his life, and they all died. The paper which they had had circulated and the discussion to which they had listened, so far, were most instructive and informing, and he hoped that what they had heard that afternoon would lead to further research work. It was one of the diseases which was the worst to deal with, and one would be glad to know whether the anti-botulism serum had been of any use. One scientist said he thought the disease was brought over by seed from the Continent imported in large quantities and which was found to have been connected with cases of that disease, and there was the suggestion that the seed, or some of it, came from Italy.

Mr. TUDOR HUGHES expressed his gratification at being present at the meeting. He proceeded to refer to cases which had come under his observation last year, and gave exhaustive and technical details. He concluded his experiences by asking whether recovery in "grass disease" was worth while.

Mr. NAIRN was understood to say that a small percentage recovered; it would probably be about 15 per cent. which made a useful recovery, but it would be quite a long time before they were useful at all. The others were hopeless and had to be destroyed.

In the course of further discussion, Mr. CURBISHLEY asked whether there was anything known about the incubative period of "grass disease," and could horses be sent to other markets, afterwards sold, and then develop "grass disease?" He had known of such cases in his own part of the country. The horses were drenched by the owner and the symptoms were marked by septic pneumonia. "If it is possible," said Mr. Curbishley, "for horses to come into England and develop "grass disease" when they get here, could we claim from the good Scots?" (Laughter).

Mr. NAIRN: It is quite possible for a horse to arrive in England and develop such a disease.

Mr. A. W. NOEL PILLERS, replying to the discussion, said that Mr. Eaton Jones had suggested that if the outbreak were written up it might be of value to the profession and whilst he (Mr. Pillers) thought it had been worth while, ("hear, hear"), he was sorry to say that he did not think anyone who had taken part in the discussion had told them anything to do which was different from what they had done, or that they should do different if they got another outbreak like it to deal with. He thanked Professor Pool for his great kindness in coming down to Liverpool to open the discussion on the paper. It was very difficult to reply to the various points raised without sitting down and thinking over them in order to be able to give a proper reply. Professor Pool had given them a great deal of help in regard to that paper and had made many useful suggestions. Some of the comments, continued Mr. Pillers, were in the nature of fine distinctions as to the terms used.

At some length Mr. Pillers referred to the cases which had been mentioned in the essay, paying tribute to his chief, Mr. Eaton Jones, and to Mr. Matthews. Passing on, he said how pleased they were to see Mr. Nairn among them. "I do not think," said Mr. Pillers, "that Mr. Nairn has added a great deal to what we say we know at the present moment, and some of the things he has mentioned were differences with fine distinctions. He objects rather strongly to the title which we use for our paper—well, we object just as much to the term 'grass disease' being given to a disease with which grass does not seem to be connected." (Laughter). Proceeding, Mr. Pillers said he had been interested in the statement with regard to aconite poisoning producing symptoms such as they had heard outlined that day. He had looked up all the text books on toxicology and in none of them could he find descriptions of symptoms such as they had found in the Liverpool cases. With regard to the remark of Professor Gaiger that he did not like "grass disease" and botulism being mentioned in the same breath, Mr. Pillers said many other speakers had already done so and had got as much weight in their expression as if they had taken a second breath. (Laughter).

With regard to the criticism of Mr. Mayall as to infection going in by way of the alimentary canal, it was the view of experimentalists that organisms might be found in the alimentary canal of animals, such for example as where a rat died, and decomposition took place, with the result that organisms came in contact with the protein of muscles and therefore were likely to make toxin. If they looked at the text-books they would see that, with regard to Borna disease, there was a considerable number of cases in which it would be found that two or three different types of diseases had been confused.

PERSONAL.

Capt. H. J. Lowe, of the Veterinary Department, Tanganyika Territory, has arrived in England on leave.

The Veterinary Record.

16th June, 1928.

THE ANNUAL GENERAL MEETING OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

The Annual General Meeting of the Royal College of Veterinary Surgeons, the convening of which is determined by Royal Charter and fixed for the first week in June, was of more than usual interest this year as it synchronised with the date arranged for the opening of the War Memorial Library. The attendance was, in consequence, better than in previous years.

As is well known, it is the occasion when the results of the annual elections of members of Council are declared, the results of which for the year we were fortunate in being able to publish in the " stop press " column of our issue of last week. There is, however, one aspect of the election of members to the Council of the Royal College of Veterinary Surgeons to which it seems right that the particular attention of the profession in general should be called. Only 1,042 members out of a total of 3,486 took the trouble to vote ; 52 voting papers were received too late to be included in the elections, and there were 38 spoiled voting papers. Surely, when so important a matter as the government and consequent well-being of a profession is concerned, such apathy on the part of its members as a whole is to be deplored. The voting of less than 30 per cent. is not fair to the candidates who offer themselves for election, and is certainly not in the best interests of the Council and the profession in the many difficult problems with which they have to contend both from within and from without.

The Annual General Meeting this year was also made noteworthy by the award of two John Henry Steel Memorial Medals, one to Dr. John Share-Jones and the other to Professor George Henry Wooldridge. As exemplars of the spirit in which this medal was founded, we feel sure that this much-prized honour could not have been bestowed on more fitting members, and we take this opportunity of offering to them our heartiest congratulations. As so aptly phrased by the President of the College in presenting the medals and in thanking them for all they had done for the profession in the past, may their example incite and encourage others to do likewise. It is in this way that the " memory of an earnest worker " can be best perpetuated.

The Annual General Meeting is also the fitting occasion when those other awards of merit, the Fitzwygram Prizes, the Walley Memorial Prize and others for our teaching schools are made. We extend our congratulations to the recipients for the year.

New Veterinary Library.

WAR MEMORIAL OPENED BY MR. AMERY.

Preparatory to the publication in our next issue of a full report of the Annual General Meeting of the Royal College of Veterinary Surgeons, and of the opening of the War Memorial Library by the Rt. Hon. L. S. Amery, the Secretary of State for the Colonies, we reproduce the following summary of these events, which appeared under the above headings in *The Times* of June 8th.

" Mr. Amery yesterday opened the new Library at the Royal College of Veterinary Surgeons, Red Lion Square, which has been built as a memorial to the 76 veterinary officers who were killed in the War.

" The President, Lieutenant-Colonel J. W. Brittlebank, said that the Library, constructed of English material in harmony with the Council Chamber, had been provided by subscriptions from members of the College and a grant of £400 from the Carnegie Trustees. It contained over 6,000 volumes, and over 70 periodicals were received. There was no other veterinary library that could compare with it.

" Mr. Amery, in declaring the Library open, spoke of the great importance of veterinary science in the development of the Empire. Not only was the field for its economic service ever growing wider as the many and diverse problems came up for solution, but contributions of the utmost value were being made by veterinary surgeons, especially in regard to the relationship of veterinary science to agriculture. During his recent visit to the Dominions he had been impressed by the immense service of this branch of science.

" Miss Haldane, who represented the Carnegie Trustees, congratulated the College and its librarian, Mr. F. Bullock, on the extensive character of its books and the admirable design of the building.

" Sir John M'Fadyean (an ex-president) and Mr. J. W. McIntosh (president of the National Veterinary Medical Association) proposed the vote of thanks to Mr. Amery and Miss Haldane.

" Colonel Brittlebank, presiding at the annual meeting yesterday at the College, said that a statement had been submitted to the Colonial Office on the necessity for improving the status of veterinary officers in the Colonial Services.

" The President made the following presentations :—

John Henry Steel Memorial Medal.—Dr. J. Share-Jones and Professor G. H. Wooldridge. Fitzwygram Prizes.—Mr. T. Johnston and Mr. E. Woodrow. Williams Memorial Prize.—Mr. G. A. Moore. Walley Memorial Prize.—Mr. Alan J. Wright."

CLINICAL AND CASE REPORTS.

Pyaemic Arthritis in a Freisian Heifer.

By Captain W. E. Blackwell, M.R.C.V.S., Towcester.

Subject.—Freisian heifer, due to calve in a week's time. Good condition.

Symptoms.—*February 11th.*—Slightly lame near hind leg, swollen from hock to stifle inside. Diffuse swelling, which was doughy and pitted on pressure. Not painful. Temp. 103.5°. Appetite only slightly impaired. On outside of hock the hair had been rubbed off by contact with cobbled floor, and there was a contused wound, dry, and scabbed over.

Treatment.—Hot fomentations, massage, salines, exercise.

Course of Disease.—*February 13th.*—Slight improvement. Heifer eating better. Excretory organs functioning normally. Treatment continued.

February 15th.—Thigh about the same. Heifer had calved—normal live calf. Near knee swollen now. Character of swelling the same. Temp. 103.5°. Owner thought this was rheumatism, but swellings were not hot or painful, though movement was hesitating and stilty. Feeding well.

February 27th.—I assumed wrongly that this case would clear up with the treatment employed; hence I left it for 12 days, with request to report any fresh development. That report arrived to-day. Now, the near stifle joint was much enlarged, in addition to the other two seats of infection. Heifer still feeding well, &c. I now concluded that the case was one of pyæmic arthritis—and that the channel of infection was the contused wound on the outside of the near hock. I now inoculated heifer with 4 c.c. bovine mixed infection vaccine, and prescribed tonics.

February 29th.—Heifer brighter; all swellings rather smaller. Feeding well. Off hock enlarged to-day on outside.

March 2nd.—All swellings enlarged. Eating well. Getting appreciably thinner and more tucked up. Temp. 103.5°. Vaccine repeated.

March 6th.—About same. Vaccine repeated.

March 12th.—Original hock wound now soft and pointing. I lanced this and pressed out at least three pints of pus, some inspissated, and with very offensive odour. The thigh and stifle swellings, and the hock also, collapsed almost like a balloon. I now repeated vaccine, ordered hot fomentations, antiseptic to wound, which must be kept open.

March 16th.—Off hock soft and pointing. This was lanced with similar result. Then off knee was lanced, and finally, near fore leg between knee and fetlock. Pus was evacuated in each case.

March 23rd.—Heifer losing condition, tucked up. Movement more painful and difficult. Still feeds well. Swellings almost gone. Discharges negligible. Vaccine repeated. Tonics and necessary nursing continued.

April 1st.—Heifer a skeleton. Refuses food. Was slaughtered. A large swelling had appeared in the brisket.

Remarks.—I was too late with my correct diagnosis. It was an unusual case, and that is my only reason for recording it. I have a record here of a case in a four-year-old colt. Cured with vaccine treatment after swelling appeared in stifle and temperature 106°. Completely recovered and turned out. Remained so for eight weeks, then simply wasted away and died after eleven weeks.

Pemphigus Vulgaris in a Bovine.

By O. Stinson, M.R.C.V.S., Appleby.

Although pemphigus vulgaris—a rare disease of the human subject—is known to be associated with disease in the lower animals, it is possible that hitherto no case has been recorded in which a veterinary surgeon has been in attendance on an animal so affected. The following cases point to the importance of practitioners being acquainted with the condition when asked to give an opinion on a skin lesion occurring in a person attendant upon a surgical case.

Whilst attending a cow to-day (May 13th) which had a necrotic patch of skin on the inner aspect of the hind limb, where the skin rubs on the skin of the hind quarter of the mammary gland of that side, I was asked to examine two fingers of the man who had been dressing the diseased area. I found two bullæ (without any sign of trauma or inflammation round about) on the knuckles and two fingers of different hands. It appeared to me to be a case of pemphigus.

Some time ago a man who was entrusted to keep clean the tail and genitals of a cow from which I had removed the placenta, developed acute pemphigus which had a fatal termination.

The following are extracts from Albutt's "System of Medicine," Vol. 8.

"*Acute Pemphigus.* The disease usually begins with a general feeling of illness, chills and rigors, and a rise of temperature. The eruption begins at one part of the body, but spreads rapidly, and may cover nearly the whole surface. As the eruption spreads, the general symptoms are aggravated. Cerebral excitement and delirium are often present, and may give place to profound coma. The temperature may rise to 104 degrees, with all the symptoms of a severe febrile disease. But in some even fatal cases there has been no fever. The urine often contains albumen, and the disease has occurred in the course of Bright's disease. In severe cases the bullæ are often hæmorrhagic, and sometimes become gangrenous; even when this is not the case, fœtid decomposition of the purulent contents of the bullæ are often observed. The attack is often fatal, death occurring usually in from one to four or five weeks, but sometimes in less than a week, even in twenty-four hours from the first acute onset.

"In a certain number of cases there is a distinct history of a poisoned wound; seventeen cases have been collected by Pernet, in most of which a wound was definitely traced. In nearly all those without a wound the patients were butchers or persons in some way connected with animals. The original lesion was usually a festering sore or whitlow which had existed some weeks or even three months before the acute attack. In a few cases animals from which the affection was derived had some cutaneous affection.

"These cases establish the evidence of a specific inoculable disease after the type of pemphigus, and it is possible that this may explain some cases in which no inoculation or trauma had been observed.

"*Chronic Pemphigus.* The onset of chronic pemphigus is generally gradual, the eruption coming out, as stated above, in successive sores, so that it is perhaps better described as a recurrent than as a strictly chronic disease. The constitutional state seems to have little influence on the eruption; most of the patients are certainly in feeble health, but there is no special kind of cachexia. If any system of the body besides the skin be affected it would seem to be the nervous system. Obscure symptoms of nervous depression are sometimes recognised before the eruption begins, and, in the severer forms, the central nervous system, or at any rate the brain, is evidently affected profoundly, as is shown by delirium and nervous prostration. The chronic state may be interrupted by acute febrile exacerbations, in which the temperature may rise to 104 degrees or more. This is indeed the commonest form of acute febrile pemphigus. Death may occur in this stage."

There are at least two other well-marked varieties of pemphigus, but they have no interest for veterinarians.

ABSTRACT.

[Stamping out of Bovine Tuberculosis. (i) v. OSTERTAG, R. *Berlin. Tierärzt. Woch.* 1927, v. 43, 373-7. (ii) PLUM, N. *Seuchenbekampfung.* 1927, v. 4, 111-23. Abst. by T. W. M. CAMERON, in *Bull. Hyg.* Vol. 3, No. 3.].

(i) Professor Ostertag reviews the measures being taken and those which he considers should be taken in fighting bovine tuberculosis in Germany. The experiences of the past twelve years show that although the principles underlying the campaign are sound, several changes in detail may be necessary. The standard to be aimed at is stated in several Orders issued by the Ministry of the Interior in 1914—Orders which could not be fully carried out during the War. Funds are now becoming available and it is hoped to prosecute the campaign with renewed energy.

Ostertag does not recommend the use of tuberculin as a diagnostic agent, as a positive reaction only shows that there is some tuberculous infection, often latent and consequently more or less harmless. It does not always show the existence of "open" tuberculosis, and advanced cases often do not react. Its use should be restricted to doubtful cases only. For the remainder, a clinical diagnosis is desirable, the diagnosis being verified by microscopic examination. Tuberculous cattle should be killed at once. So far farmers have been poorly compensated for such slaughtered animals, and this has often led to concealment; a more generous attitude has been promised for the future, however. He recommends that both cows and milk should be examined twice yearly; but this system must be introduced gradually in order to obviate unnecessary hardships to the farmers. In addition to State measures, a voluntary campaign must accompany these measures, and farmers should have their herds periodically examined by a veterinary surgeon, and calves should be separated

(Continued at foot of next column.)

DIVISIONAL REPORT.

Lancashire Division.*

A General Meeting of this Division was held at the Liverpool University, on Friday, April 20th, 1928, when the President, Mr. H. H. Aldred, occupied the chair. Others present were:—Messrs. F. A. Ball, E. L. Butters, W. G. Burndred, W. L. Cockburn, E. H. Curbishley, W. Fowle, S. H. Gaiger, J. N. J. Hagan, J. Holroyd, R. Hedley, H. G. Hewetson, R. Hughes, T. Eaton Jones, W. Kendrick, P. T. Lindsay, H. D. Matthews, G. Mayall, A. W. Noel Pillers, J. Spruell, H. Sumner, Junr., H. L. Torrance, C. T. Trevers, A. Walker, F. S. Warburton, E. F. Wood, W. Woods and J. H. Wright. *Visitors*:—Messrs. Tudor Hughes, L. W. Wynn Lloyd, W. Nairn, J. W. Thwaite and Prof. W. A. Pool.

Apologies for unavoidable absence were received from Lieut.-Col. J. W. Brittlebank, Messrs. J. H. Carter, G. H. Locke, J. McKinna and W. Tweed.

The *minutes* of the last general meeting were taken as read and were approved.

A letter from the Editorial Representative of the N.V.M.A., was read, asking the members to send in original case reports so as to make the *Veterinary Record* of larger interest to the practitioner.

The Secretary read the Revised Scale of Salaries for whole-time Veterinary Appointments, which had been adopted by the Council of the "National."

It was proposed by Major WRIGHT, seconded by Mr. WOODS and carried, "That this Division consents to combine with the North of England and the Yorkshire Divisions in the issue of a joint election circular at the forthcoming election of Council, and promises to support their candidates in return for their support of our candidates."

Mr. Harry D. Heggarty (Manchester) and Mr. George McKee (Nantwich), were nominated for membership of the Division.

The President informed the members that as copies of the paper on "Labio-glossopharyngeal Paralysis" had been circulated to all the members, he would now call on Professor Pool to open the discussion thereupon.

(Continued from previous column.)

from their mothers on the second day of life and fed thereafter either on milk heated to 85 degrees C. or on milk from a tubercle-free cow. It is not desirable to deprive the calf of the colostrum on its first day, as intestinal troubles are liable to develop.

(ii) Plum similarly considers the situation in Denmark, where milk, both for direct human consumption and for butter manufacture, is of unusual importance. He also considers that any officia. campaign; unsupported by voluntary private effort, would be usleess. The anti-tuberculosis campaign in Denmark was started in 1892, when Bang commenced his work, and the percentage of cattle reacting to tuberculin has decreased to a remarkably small figure, while both the milk and butter yields have increased in farms where the campaign has been conducted.

* Received on 2nd June.

[This paper, by Messrs. T. Eaton Jones, A. W. Noel Pillers and H. T. Matthews, is reproduced, together with the discussion, at the commencement of this issue of the *Record*.—Ed.].

Proposing a vote of thanks to Professor Pool, Mr. WOODS said he did not think he had ever listened to a more scientific discussion, or one more adequate to a very difficult subject. He also wished to acknowledge the great help he had received—as he was sure they would all have done—from the remarks of Mr. Nairn. ("Hear, hear.")

The PRESIDENT said he thanked Professor Pool and Mr. Nairn and all who had taken part in the discussion. He also wished to thank the authors of the paper; it was one of great importance and one which, he thought, might lead to further discussions and investigation into a subject which had undoubtedly intrigued the whole of the profession.

The vote of thanks was carried with acclamation, and subsequently the President entertained the members to tea, thus closing a most successful and interesting meeting.

J. SPRUELL, *Hon. Secretary.*

STUDENTS' CONTRIBUTIONS.

Poisoning from *Mercurialis perennis* (Dog's mercury).

By A. J. WRIGHT,
Class "D," Royal Veterinary College, London.

Three outbreaks of poisoning due to *Mercurialis perennis* were observed. The first outbreak occurred in two cows.

History. The two cows suddenly developed alarming symptoms.

Symptoms. At the first visit the cows were seen to be very distressed and at first sight it was obvious that nervous symptoms were prominent. One animal was down and unconscious and died within a few hours. The other animal showed somnolence, trembling, delirium at times, cold patchy sweats on the back and sides, and this ended in paralysis, but death in this case did not take place until forty-eight hours after the onset of symptoms.

Post-mortem. Little was found to account for the deaths. There were signs of slight inflammation of the alimentary tract. The stomach contents and parts of the viscera were sent up for analysis, but nothing of any help was detected.

On searching the field where the cows had grazed, specimens of the plant were found and sent to Kew Gardens, where they were recognised at once as *Mercurialis perennis*, or Dogs' mercury. The toxic principle of this plant is mercurialine, oil of euphorbia, a volatile toxic alkaloid.

The second outbreak occurred in the same field, some months later, it having been left vacant for some time. A number of store cattle were turned out into this pasture, and four of these died suddenly. No *post-mortem* was made in these cases.

The third outbreak occurred in some lambs. The lambs had got at the plant by breaking through into a garden, a long way removed from the pasture where the cows died. They showed symptoms of staggering, quickly followed by convulsions, champing of the jaws, frothy salivation, paralysis and death within a few hours.

The loss of one cow and severe illness of four others due to this *Mercurialis perennis* was recorded by Blackhurst in the *Veterinary Journal* in 1896. Gusson mentioned the loss of cows in the *Farmer and Stockbreeder Year Book*, 1907, while the loss of horses fed on herbage cut from a hedge containing *M. perennis* was recorded in the *Journal of the Royal Agricultural Society* in 1898.

Bracken Poisoning (?) in Sheep.

By J. D. PEELE, Class "C," Royal Veterinary College, London.

Subjects.—Cross-bred ewes, some of which had lambed.

History.—The ewes had been moved up near the farm buildings for lambing and were pastured on a hill-side on which there was bracken growing. So far as could be ascertained there had been no bracken in the pasture where they had previously been running. They were receiving, in addition, a ration of crushed oats, chopped roots, both in normal quantities and of good condition, and also hay.

After the ewes had been on the new pasture for about three weeks, several were taken ill. The farmer gave them linseed oil, and as they did not improve, sought advice.

When seen, five of the sheep had died, two on the day of inspection and two others were ill.

Symptoms.—The affected sheep presented the following symptoms: staggering gait, hurried respirations, thirst and a temperature in one case of 105°F and in the other case 105.8°F. Vision was not impaired, but there was a profuse diarrhœa. Appetite was in abeyance.

Post-mortems were conducted on two of the dead ewes, one of which had lambed.

These ewes had been noticed to be ill for about twenty hours before death supervened.

Stomach.—The rumen was normal in appearance, though rather engorged with food which consisted of oats, turnips, grass and hay.

The abomasum showed severe inflammation.

Small intestine.—The whole of the small intestine was badly inflamed and in some places there had been hæmorrhages into the lumen.

The liver was slightly pale and fatty.

The lungs were congested and showed small hæmorrhages.

The heart showed small hæmorrhages.

Diagnosis.—When the pasture was examined it was found that the tops of the bracken had been eaten. The symptoms were ascribed to bracken poisoning.

Treatment.—The sheep were at once moved to a place where there was no bracken. The affected sheep were given a saline purgative, followed by a draught, containing chlorodyne and spts. æther nit. in water every six hours. One more sheep died.

Institute of the Horse Slippery Road Tests.

As our readers will be aware, one of the principal activities of the Institute of the Horse at the present time is an endeavour to overcome the slippery road problem in the interest of horses and their owners. With this end in view, the Institute recently advertised for non-slip shoes and pads to be submitted to them for practical tests for hunting, hacking and draught purposes, on slippery roads and across country.

A ready response was made and the tests, commencing in January and concluding in April, resulted in first place being secured by Gray's Patent Flexible Bridge Pad ("Gragrips.")

We are glad to give publicity to the success achieved by an appliance the merits of which have long been made known to the profession through the medium of this journal.

Impending Retirement of Mr. E. White Wallis.

The many members of our profession who have enjoyed the ministrations of Mr. E. White Wallis in his capacity as Secretary of the Royal Sanitary Institute, and therefore as the official mainly responsible for the management of the Institute's Congress, at which the profession is always well represented, will learn with regret that Mr. Wallis is retiring in a few weeks from the secretaryship, after nearly 48 years of service.

In an appreciative reference to the work of Mr. Wallis, which appears in the current issue of the Institute's *Journal*, Dr. Louis C. Parkes says :—

" In November, 1880, Mr. White Wallis was appointed Secretary to the Sanitary Institute, the offices of the Institute being then at No. 9, Conduit Street, W. The Sanitary Institute had then been in existence for about four years, and while the work of the Institute had been well started, the Institute was still in its infancy. The extension and growth of the Institute in all its branches between 1876 and 1928, and its present influence as an organ of professional and popular education in Hygiene and practical sanitation both in the British Isles and in the Overseas Dominions and Colonies of the British Empire, have been the work in co-operation of the successive Councils, Chairmen of Councils, and Honorary officers of the Institute, with the executive staff.

" Mr. White Wallis possessed the foresight and imagination to indicate to the Council the directions in which the Institute's work might be most successfully extended, and the Council in approving and adopting, after careful consideration of methods and details, such schemes of extension and advancement, knew that the Secretary had the executive ability and the diligent application to carry his task through to a successful conclusion, with the help of his staff, which he had himself so trained and organised as to produce a very efficient executive instrument for the purposes of the Institute.

" A special feature of the Institute's work, which owes much of its success to Mr. White Wallis's organising ability, and his skilful and tactful handling of the difficulties and misunderstandings that inevitably arise where considerable numbers of persons are concerned in carrying through a joint undertaking, is the Annual Congress and Exhibition of the Institute. They very much depend for their successful working upon the co-operation and co-ordination of Mayors and Chairmen of Town Council Committees and their chief officers with Mr. White Wallis and his staff. It is only the truth to say that these Congresses are invariably successful, because the arrangements are all so skilfully made, and dovetail into one another with such beautiful accuracy, that there is no friction or loss of time anywhere. Mr. White Wallis has made the holding of Congresses and Exhibitions a fine art. The members of the Institute, the delegates appointed by Overseas States and Local Authorities, and the general public all attend in large numbers, and show an interest in everything that goes on. The machinery runs so smoothly because every item of its working has been carefully planned in advance, and all the parts are kept well oiled during running by tact and careful management.

" Mr. White Wallis was joint Hon. Secretary to the Congresses of International Hygiene in London in 1907, and in Paris in 1909, and was awarded the order of " Officier de l'Instruction publique " by the French Government in 1907. He is a member of the General Committee of the British Association.

" In 1926, he was awarded by H.M. The King the order of O.B.E., for his eminent services in the cause of the health and betterment of the British Empire.

" The Chairman and Council of the Institute desire to thank Mr. White Wallis for his long and faithful services to the Institute, and to wish him every happiness in his approaching retirement."

Milk and Public Health.

R.C.V.S. President's Views.

Contributing to a discussion on a paper " The Sterilization of Milk," by Mr. R. W. Lane, at a recent meeting of the Royal Society of Arts, Lt.-Col. J. W. Brittlebank, President of the Royal College of Veterinary Surgeons, said, as reported in *The Dairyman* of May 19th, that he did not believe that sterilisation or pasteurisation was the aim-all and end-all of the treatment of milk. He was going to admit at once that they were a great public health expedient for the time being, but he hoped that those associated with the work—and they in Manchester had pushed pasteurisation as far as they could, and had 90 per cent pasteurised to-day—would not lose sight of the very big economic problem behind these expedients which could not be carried out without an additional charge on the industry, and of the fact that the real article they ought to aim at was good, clean, raw milk. (Hear, hear.) The point about which he was concerned was that in taking hold of these expedients they were losing sight of the importance to agriculture of a reduction in the immense amount of tuberculosis in cows. Our herds to-day were probably as fine as any in the world, and it was absolutely incumbent upon the public health men to appreciate that public health was closely allied with that of animals. They could not separate the two. He stood before them as a man who had devoted himself to human public health for the last twenty-eight years, and he was also a veterinary surgeon who had spent his life trying to deal with the animal scourge and endeavouring to get a pure milk supply, and he was not yet disappointed. He thought it was quite within the field of accomplishment. They had had, however, too many charlatans advising them, and in the multiplicity of advice that the country had had British agriculture had been passing through probably the worst time in the history of the oldest of them. He knew the difficulties of the farmer. Unless they concentrated on the reduction of tuberculosis in animals they could do nothing ahead for agriculture, and be it observed the milk supply could not be separated from true agriculture. Tuberculosis was the keynote of the whole problem, and if they could eliminate this scourge they would eliminate a tremendous percentage of the losses which agriculture suffered in regard to its livestock. In recent years legislation had shown a tendency to become more and more complicated, and to direct itself into watertight compartments which were of no use to anybody. (Hear, hear.) In 1913 a Tuberculosis Order was launched upon this country, but how far had they got ? It was, of course, suspended during the war, but it had had a fair test, and because of the lack of proper administration it had to-day effected practically nothing. He did not think it was an exaggeration to say that practically every animal that was removed under that Order had done all the harm it was likely to do. (Hear, hear.) It was never intended that the Order should be allowed to dwindle and become so inefficient ; it was intended to be a starting point for an attack on the great animal scourge. He believed that he was justified in saying that the whole of the money spent on the administration of the Order was wasted. (Hear, hear.) What was wanted was that the farmer should be treated like the rest of the community who were desirous of the best that could be given. If they would only take him in and ask him to lend a hand they would get magnificent results. They might still find that it was necessary to pasteurise—he believed it would be necessary for many years to come because the battle they were waging was a gradual one—but he did make a plea that a meeting like that should urge upon the Legislature that the battle of tuberculosis was not fought by merely directing its attention to humanity alone. The tuberculosis of men and animals was the same disease, promoted under the same conditions. What had been done for man in the reduction of tuberculosis could also be done in the animal kingdom, to the immense advantage of those persons concerned particularly with the nation's milk supply. It was not for him to go

into the losses incurred. He had in another place read more than one paper on estimates that he had tried to formulate, but the losses were enormous. Out of our 3,000,000 dairy cows at least 1,000,000 were infected with tuberculosis in some form or other,.

The Handling of Milk.

Dr. Gerald Leighton, in the course of an address on "Clean Food" at the recent conference of the Association of Teachers of Domestic Subjects, said that the most important of their national foods was milk, in regard to which there had been an immense improvement in recent years, especially since the introduction of the Milk and Dairies Act. The milk supply on the whole was now very good. It was no use, however, providing clean milk if it were treated dirtily at home. Too often the milk was poured out of the clean sterilised bottle into a carelessly cleaned jug or bowl, and then left to stand on the kitchen table or some other warm place, instead of being kept in the bottle and in a cool spot. He would like to see the bottle of milk treated like a bottle of the most precious wine, not to be decanted from one vessel to another, but carefully passed round, and only poured out at the moment it was going to be consumed. The people also should be clean. When all those who handled food knew that bacteria were all around them and might be conveyed to food through earth, air, and water, that they might be retarded in their growth by cold temperatures and killed by sufficiently high ones, and that they were heavier than air, and fell on to unprotected food, and when they acted upon that knowledge, then they would be on the way to securing a supply of really clean food.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

June 18th—Meeting of Editorial Committee N.V.M.A., 4-30 p.m.

June 20th—Meeting of the Scottish Metropolitan Division at the Royal (Dick) Veterinary College.

July 4th—R.C.V.S. Annual Dinner, Hotel Victoria, W.C.2.

Cambridge Professorship of Animal Pathology.

At a meeting of the electors to the Professorship of Animal Pathology on Saturday, June 9, Mr. James Basil Buxton, M.A., F.R.C.V.S., D.V.H., was re-elected into the Professorship.

The electors present were: the Vice-Chancellor Sir H. K. Anderson, Master of Gonville and Caius College; Professor T. B. Wood; Professor Dean; Professor Hobday; Sir W. M. Fletcher and Professor Nuttall.

Methods of Slaughtering.

"Dr. Gerald Leighton, of the Scottish Board of Health, in his Benjamin Ward Richardson Memorial Lecture (now published in pamphlet form), has given an excellent summary of the present position of the meat food industry from a public health point of view," says the *British Medical Journal*. "On the advantages of the modern abattoir under the direct control of a public health authority over the privately owned slaughterhouse no doubt can exist. The high standard of proficiency demanded of inspectors is good for both the public and the trade. The former can rest assured of obtaining meat in a wholesome and fresh condition, while the latter can be confident that no carcases are unjustly condemned. Dr. Leighton is not satisfied with the methods of slaughter of pigs, calves and sheep. He thinks that no animal should be killed by bleeding without previous stunning. Much improvement in droving and sea transport can yet be made. Rough treatment of animals prior to entering the abattoirs causes much unnecessary suffering. Dr. Leighton's view that animals are indifferent to scenes of bloodshed within slaughterhouses must be listened to with respect, though it leave us only partially convinced. He advocates the large central abattoir built on the open hall system as opposed to one divided into a number of small booths. The central open abattoir is best for the disposal of offal, and also offers greater facilities for pathological examination."

Dogs and Poultry.

A Correspondent writes to *The Times*:—

"Poultry-keepers are much concerned as to the fate of the Dogs Act (Amendment) Bill, a private member's measure which has already had its second reading in the House of Commons. One purpose of the Bill is to extend to poultry-keepers the right to recover damages for injury to fowls inflicted by a dog, in the same way as the Dogs Act of 1906 conferred the right upon owners of cattle. The fact that poultry were left unprotected by the Act of 1906 can only be attributed to the belief that at that time fowls were not considered of sufficient value as farm stock. The Bill has secured a good deal of support from members of all parties in the House; but its further progress has been checked through the action of Mr. Maxton and Mr. Neil Maclean in objecting to the word "poultry" in Clause 1, which is the vital point of the Bill. The last time the Bill was called for Committee the objection of these members rendered the proceedings abortive and it has now been put down for June 15.

"Efforts have been made to ensure that the Bill shall have uninterrupted discussion on that occasion, and it has been pointed out that the chief sufferers through the present state of the law have been ex-Service men and other small-holders of limited means, whose losses have in some cases deprived them of a livelihood. Poultry-keepers submit that discrimination against a useful class of livestock like the domestic hen which presents possibilities to the humblest workers, is fundamentally unjust to egg and poultry producers as well as to consumers."

H.M. Stationery Office Publications.

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28 Abingdon Street, S.W.1; Cardiff: 1 St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120 George Street.

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138. Dogs and Cats. To facilitate the recovery of lost Dogs and Cats ...	0 1	0 1½
Command Papers:		
3112. Scottish Board of Health. Ninth Annual Report, 1927	6 6	7 0

World's Dairy Congress.

Medical men from all over the country will attend the eighth World's Dairy Congress, which is to open in London on June 26th, and close after sessions at Reading, Edinburgh, Glasgow and Nottingham, on July 12th. The purpose of the Congress, which has never before been held

in England, and at which over 1,000 delegates from 47 different countries will be present, is to effect an international exchange of the latest knowledge of the science and practice of dairying, and the value of milk and its products in the human dietary.

Dr. Thomas Orr, M.D., D.Sc. (M.O.H. for Ealing), who is Chairman of the Conference Committee, has arranged for papers to be given dealing with the importance and nutritional value of milk, and recent advances in the knowledge of the vitamins in their relation to milk production. These questions will be discussed by Professor E. V. McCollum, Ph.D., Sc.D., of Johns Hopkins University, U.S.A., and Professor J. Drummond, F.I.C., D.Sc., of the University of London. Dr. H. Corry Mann, O.B.E., M.D., is to read a paper on the value of dairy produce in the school, whilst Drs. O. Garzia and E. Savini, of Italy, are to open a discussion on the determination of the energetic power of milk in regard to the alimentary requirements of the infant.

The Health Departments of local authorities will be strongly represented at the Congress, and two notable papers are to be given by Sir John Robertson, C.M.G., M.D., LL.D. (Professor of Public Health, University of Birmingham), and Professor H. R. Kenwood, C.M.G., M.B., F.R.S.E. (M.O.H. for the County of Bedfordshire), who will talk on milk from the standpoint of communicable disease and on its importance as a Public Health agent respectively.

The Veterinary Officers' section has a busy programme, and one of the questions to be discussed is the inspection of dairy cows and the need for a state Veterinary Health Service.

ARMY VETERINARY SERVICE.—TERRITORIAL ARMY.

June 12.—Maj. (Bt. Lt.-Col.) P. W. Dayer Smith, O.B.E., T.D., ceases to command a mobile vet. sect. (Feb. 29).

CORRESPONDENCE.

William Harvey.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—In connection with the Tercentenary of William Harvey, I did not observe that our College was invited to join in the international celebrations. It is, therefore, of interest to rescue from the scrap heap a note written sixty years ago by a veterinary surgeon on the then condition of Harvey's tomb. The writer also refers to a story which I do not remember seeing mentioned during the recent celebrations.—Yours truly, F. SMITH.

10*th June*, 1928.

The note to which our correspondent refers is as follows:

VISIT TO DR. HARVEY'S TOMB.

By ISAAC SEAMAN, M.R.C.V.S., Saffron Walden.

About a month since, Drs. B. Richardson, Lloyd, Winslow, with other distinguished medical men of London, paid a visit to Hemstead Church, the resting place of the remains of the immortal Harvey, the discoverer of the circulation of the blood. I had the honour of being present. Dr. W. Harvey was the son of Mr. Harvey, a merchant of London, whose country residence was at Hemstead, Essex. Nothing remains of the mansion but the site, a pasture of about an acre and a half, surrounded by a moat of great width. Mr. Harvey died in the year 1657, aged 79. There are in the vault of the church fifty-two tombs, all of the Harvey family, that of Admiral Harvey being one of the number.

The dame who showed the vault had been servant to a descendant of the doctor, and appeared well up in the history of the Harvey family. One gentleman suggested the removal of the remains of the doctor to a place more appropriate for so great a man. "But," said the dame, "the doctor left all his money to the College of Physicians, and the College has not taken any notice of the tomb for 200 years; and Mrs. Bramston, who is a descendant of Dr. Harvey, will not allow the coffin to be removed." The coffin is made of lead; the roof is depressed, giving it a trough-like appearance. There is a long slit in it, and the contents examined through the slit appeared like black mud. There is no tomb of the doctor's wife; the family do not think there ever was a Mrs. Harvey, but Dr. Richardson said that in some of his works Dr. Harvey speaks of his wife's parrot, clearly showing there was a Mrs. Harvey. A very singular incident which occurred in the life of Harvey was mentioned by Dr. Winslow. The doctor had intended crossing to France on a certain day, but the night previously dreamed he was sailing, and the ship and crew were lost. In consequence of the dream the doctor did not go. The ship sailed at the appointed time and was lost with all the crew. The circulation of the blood had not then been discovered, and had not Dr. Harvey been forewarned of the catastrophe his grand discovery might have been deferred for another century.

(Extract) *The Veterinarian*, Vol. xli., 1868, p. 609.

R.C.V.S. Council Election.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—May I, through the medium of the columns of the *Veterinary Record*, express my deep appreciation of the confidence placed in me by the 409 Members and Fellows of the profession who gave me their vote at the recent election to Council of the Royal College of Veterinary Surgeons?

Although the number of votes cast in my favour was insufficient to give me the dignity of a member of Council, it is unnecessary to add, I hope, that my efforts on behalf of the profession will, as in the past, albeit in small measure, be as whole-heartedly given.—I am, yours faithfully, GEO. W. DUNKIN.

National Institute for Medical Research,
Farm Laboratories,
Mill Hill,
N.W. 7.
7*th June*, 1928.

. . . . . .

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—Will you permit me, through the *Veterinary Record*, to thank those members of the profession who voted for me at the last election for the Council?

May I say that I cordially agree with those who preferred to vote for previous members in recognition of their eminent services.

I am flattered by the knowledge that my experience, which has been mainly gained abroad, received some measure of appreciation, and I trust that I may yet be able to be of some service to the profession.—Yours faithfully, G. K. WALKER (Colonel).

Abingdon,
Berks,
11*th June*, 1928.

. . . . . .

TO THE FELLOWS AND MEMBERS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

Ladies and Gentlemen,—Will you please accept my most grateful thanks for your kindness in re-electing me for the fifth consecutive period of four years as one of your representatives on Council.

It will always be my endeavour to advance the interests of the profession of which we have the honour to be members.

Believe me to remain, your obedient servant,
JOHN SHARE-JONES.

. . . . . .

Dr. A. Leslie Sheather wishes to convey an expression of his thanks to those members of the profession who supported his candidature at the recent election.

The Editor acknowledges the receipt of the following:—

Communications from Major T. Dalling, Captains R. Daubney and A. W. Noel Pillers, and Mr. R. H. Smythe.

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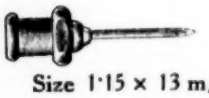

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(Established 1905)

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A. T. KINSLEY, D.V.S.

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